CHILTON'S
November 1, 1985

IRON AGE

MANUFACTURING MANAGEMENT

BATTLE OF THE AUTO SUPPLIERS:

ETROIT SCANS THE GLOBE FOR
HE BEST PARTS

MERICAN STEELMAKERS FACE
A DUAL CHALLENGE

IS HISTORY ON THE SIDE OF
PROTECTIONISM...OR FREE TRADE?

CK014CONGRESSION00
APR85
CONGRESSIONAL INFO SERV / DIR
SPI ACQUISITIONS
4520 EAST WEST HWY
BETHESDA MD 20814

NOVEMBER 1, 1985 VOL. 228, NO. 21

CHILTON'S
IRON AGE
MANUFACTURING MANAGEMENT

Editorial 7
Am I misinformed?

Newswatch 13
Honda expands its American production and supplier base.

Machine Tool Report 22
U.S. competitiveness in FMS is being challenged.

You and Your Job 24
Japanese and U.S. officials mull over workplace stress.

Auto Materials I 29
U.S. auto suppliers can help themselves by helping Detroit cut costs.

Auto Materials II 37
American steel battles imported steel and plastics.

Trade 48
Has protectionism hurt the U.S. or helped it?

Cast Iron 59
Things are happening in gray and ductile iron.

Technically Speaking 75
Prices drop for a new metal matrix composite.

Materials Report 88
Steelmakers will raise sheet and tinplate prices.

Order Trends 100
Autos and aircraft account for the latest rise in orders.

Next Issue: Selecting the Dream Factory.

Departments

EDITORIAL STAFF 11
SIGNED, SEALED AND DELIVERED 11
INDUSTRY BRIEFS 19
PRODUCT & EQUIPMENT REVIEW 78
P&P DATA 10/7 89
BUSINESS STAFF 90
AD INDEX 90
MANAGEMENT SERVICE CARD 91
FERROUS SCRAP 10/7 93
STEEL PRICES 94
CLEARING HOUSE 98

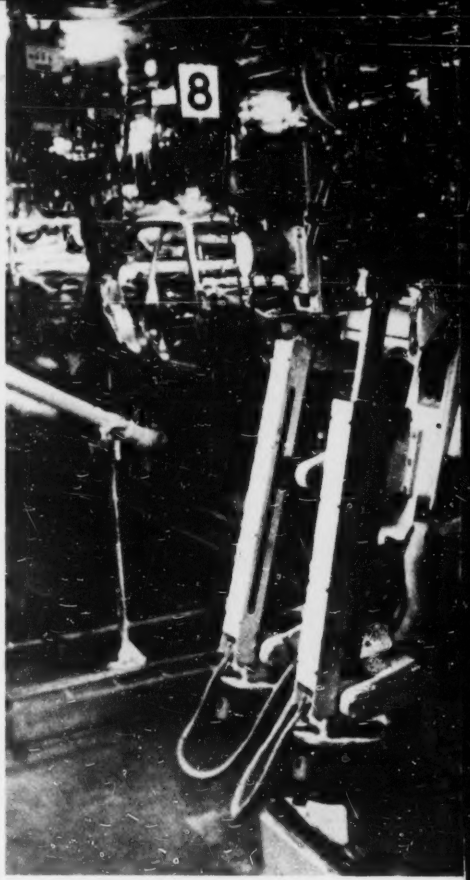
IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$42 one year, $69 Canada/Foreign (24 issues); Metalsproducer U.S. edition—$24 one year (12 issues); $27 one year (6 issues). Single copies, $2.50. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077.

Chilton
abc

ONE OF THE ABC PUBLISHING COMPANIES

BATTLE OF THE AUTO SUPPLIERS:

Detroit Scans The Globe For The Best Parts



BY BRYAN H. BERRY

Now is a crucial time for the American automotive supplier industry.

Japanese automakers have a cost advantage of $2,500 in small-car manufacturing over their American competitors. Of that $2,500, fully $800 is due to the lower costs of Japanese suppliers, said Kenneth Whipple, Ford's vice president of corporate strategy.

U.S. automakers are committed to cutting the cost of manufacturing cars by 25-30 pct, or the full $2,500, by 1990. If American suppliers don't help Detroit cut costs hugely, Detroit will buy those parts from overseas.

By 1990 Japanese automakers will be building 1.3 million vehicles in the U.S. Unless American suppliers can ship the cost, quality, and delivery the Japanese automakers demand, expect a flood of Japanese suppliers to follow their countrymen to the U.S.

"There is no question but that U.S. suppliers should put extremely high priority on developing business with Japanese-owned, U.S.-based assemblers," stated Michael S. Flynn and Daniel D. Luria in a publication for the Industrial Technology Institute (Ann Arbor, Mich.) this year. "For many suppliers success here will mean survival; failure, total bankruptcy."

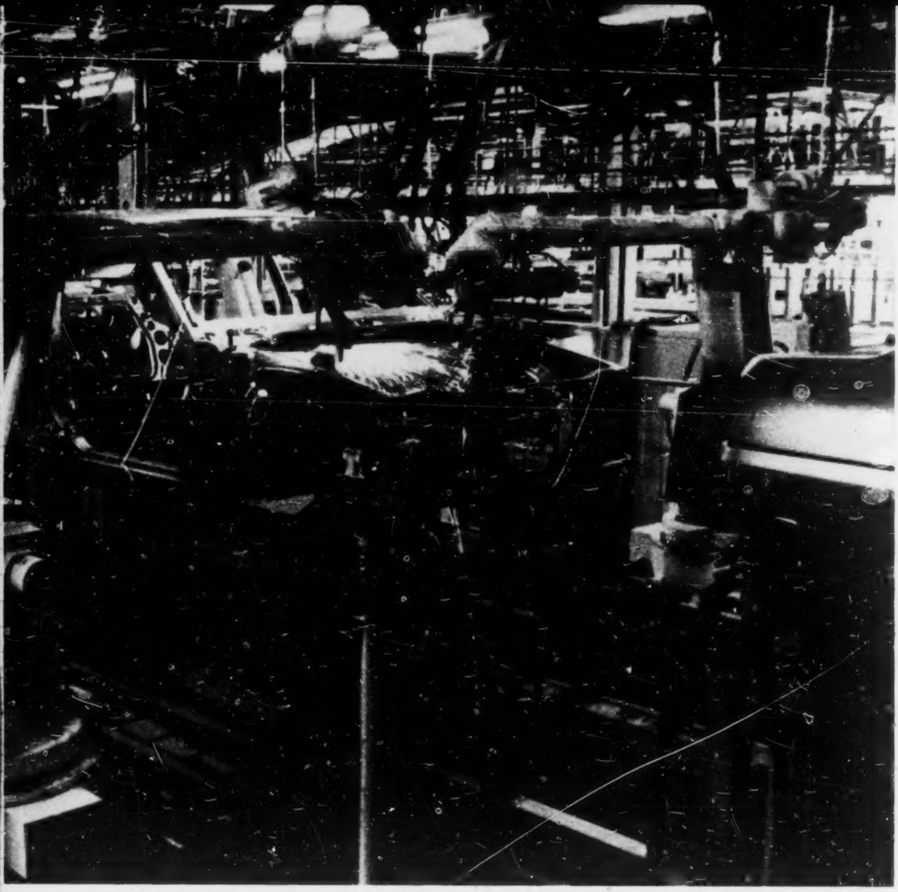
Some American suppliers have scored notable successes in selling to Japanese automakers not only in the U.S. but in Japan as well. Others not only have failed to sell to the Japanese but have lost contracts that they once had with them.

Kelsey-Hayes (Romulus, Mich.), for example, originally had the contract to supply wheels to the Nissan truck plant in Smyrna, Tenn. But Topy Industries of Japan, which supplies Nissan's Japanese plants, convinced Nissan U.S.A. that it could do a better job than Kelsey-Hayes. Topy presently is building a $26 million plant in Frankfort, Ky., that will supply all Nissan U.S.A.'s truck wheels starting next year.

"We are convinced that Topy will be more competitive in quality, cost, and delivery than Kelsey was," explained Robert A. Frinier, a former Ford manager who now serves as Nissan U.S.A.'s vice president of purchasing and information systems. Kelsey-Hayes will have no Nissan business when Topy takes over, though Mr. Frinier says Nissan is considering Kelsey as a supplier of brake and axle components. Topy, meanwhile, also has won a contract for Honda's Marysville, Ohio, plant and is seeking more U.S. business.

Chevrolet's Nova subcompact, built by the GM/Toyota joint venture, uses 1,450 parts from Japan and 400 from the U.S.

Another American supplier will lose business when a GM division begins a joint venture with a Japanese supplier of seats. No. 3 automaker Chrysler plans to import castings, electronics, and powertrain components from South Korea's Samsung.



"We also want our U.S.-based suppliers to form separate joint ventures with Samsung," explained Chrysler Vice Chairman Gerald Greenwald. "We don't want this to be just a joint venture between two car companies." The two automakers also are discussing cars that Chrysler could import from Samsung.

This year Chrysler created the International Business Development Group, headed by Stephan Sharf, its former manufacturing vice president. "Our aim is to establish worldwide trading partners who will help us remain competitive," explained Mr. Sharf. Mr. Sharf is enlisting the aid of L. Schuler, the West German machine-tool maker, to help Chrysler modernize its three stamping plants so they can produce the equivalent of four plants' output.

The North American content (which includes U.S. and Canadian parts) of Chrysler's cars has slipped from 94 to 90 pct in the past two years. GM and Ford's hover around the 95-pct mark.

So far the U.S. trade deficit in auto parts—$3.4 billion in 1984—is dwarfed by the $29.7 billion deficit in vehicles. In 1984 foreign companies shipped $16.7 billion worth of auto parts to the U.S.—but Americans punched back with $13.3 billion worth of exports (see chart, p. 29). That's much more than the paltry $7.5 billion of vehicles exported by U.S. automakers. In 1981, U.S. auto-parts suppliers had a record trade surplus of $1.3 billion.

Cutting Costs

But the competition is stiffening as the Japanese build U.S. auto plants and as Detroit vows to wipe out that $2,500 Japanese cost advantage. "Not only are automakers putting extreme pressure on their suppliers to cut costs and prices," said one steel executive, "but they're also telling their suppliers to buy the lowest-priced steel they can find—no matter where it's from." (See following article.)

Automakers are pressing many suppliers, including Kelsey-Hayes, to cut costs by fully 8 pct per year over the next several years, reported John Utley, president of Kelsey-Hayes' automotive group. "Auto suppliers are going to have to have world-class prices to compete worldwide," said Mr. Utley.

Most of the major suppliers, such as TRW, Rockwell, Allied, and Borg-Warner, have overseas plants. Such American suppliers are shipping parts to automakers in Japan from plants both in Japan and the U.S. Japanese plants of Nissan buy transmissions from Borg-Warner; Toyota, aluminum wheels from Rockwell; and Isuzu, Nissan, and Toyota, turbochargers from Garrett.

But it's not just the multinational giants who have scored orders abroad. Monroe has had success selling shock absorbers in Japan. Donnelly, a $100 million company, is shipping overseas 20 pct of its wares—mainly mirrors and windows, from plants in the U.S. and Ireland—and plans to double that figure by 1990.

By 1995, 20-25 pct of the parts imported into the U.S. will be made in foreign plants owned by U.S. automakers, predicted the automakers and suppliers who participated in a recent Arthur Andersen study. Another 15 pct of the imported parts will come from foreign plants owned by U.S. suppliers, said the panelists, who also forecasted that the foreign share of the U.S. auto parts market will grow by 5-6 pct per year from 1985 to 1990.

(Cont. on p. 29)

Dense, advanced-technology, proprietary products lend themselves most to overseas shipping. Engines and transmissions are perfect examples: All the Japanese automakers in the U.S. are buying those from Japan. A growing number of U.S.-owned auto plants are receiving powertrains from Mexico, Brazil, and Japan. U.S. automakers also are considering importing such labor-intensive parts as wiring harnesses.

Low-tech, bulky products with low labor content lend themselves most to production in the same country as the automaker.

"It's the suppliers between those two groups that I'm most concerned about," said Peter Van Hull, a Detroit partner of Arthur Andersen & Co. "A huge number of suppliers make parts that don't have much technological superiority over the offshore competition. Those suppliers in particular really have to knuckle down and learn how to do just-in-time manufacturing."

Most car parts are in this medium-tech range most vulnerable to foreign competition. Instrument panels, steel, seats, wheels, axles, bumpers, and many more such parts are natural targets of offshore competition.

Just-In-Time

To be sure, American suppliers have significant advantages over foreign plants in winning business from Detroit. The American plants are much nearer their customers and can ship parts just in time. Freight

Cars and Car Parts: Imports vs. Exports

U.S. Automotive Imports
(in millions of dollars)

1.	New passenger cars	$30,423
2.	New trucks and buses	6,541
3.	Gasoline engines	2,401
4.	Transmissions	992
5.	Car tires	833
6.	Radio/tape players	824
7.	Car, truck, and bus chassis	696
8.	Truck and bus tires	688
9.	Engine parts such as rods and crankshafts	621
10.	Brakes and brake parts	532
11.	Furniture and parts	481
12.	Used passenger cars	327
13.	Wheels	298
14.	Bumpers	223
15.	Springs and leaves for springs	222
16.	Body stampings	221

U.S. Automotive Exports
(value in millions of dollars)

1.	New passenger cars	$4,876
2.	New trucks	2,219
3.	Body stampings	1,416
4.	Transmissions	1,074
5.	Gasoline engine parts	868
6.	Gasoline engines	655
7.	Diesel engine parts	547
8.	Brakes and brake parts	537
9.	Air conditioners	357
10.	Ignition wiring sets	342
11.	Diesel engines	340
12.	Tires and tubes	290

Source for both charts: Motor Vehicle Manufacturers Assn., U.S. Bureau of the Census. These are 1984 figures and include all items with a value of more than $200 million.

Who Ships Car Parts to the U.S.

(in millions of dollars)	1983	1984
1. Japan	$2,113	2,944
2. Mexico	1,208	1,609
3. West Germany	631	701
4. Brazil	424	640
5. Taiwan	248	470
6. Korea	254	456
7. France	324	413
8. United Kingdom	232	313

Source: International Trade Commission, Industrial Technology Institute. 1984 figures are estimates based on Jan.-Oct. data.

Nissan began building Sentra cars at its plant in Tennessee this year.

to the U.S. costs Japanese plants $500 more than it does U.S. plants, estimates one automaker.

Also, American automakers and suppliers share the same culture, and Americans generally want to buy from other Americans who can compete with offshore competition. True, American suppliers have higher labor, material, and operating costs than the Japanese. But the Americans' advantages offset their higher per-piece costs, said Mr. Van Hull. "American suppliers simply understand how the U.S. auto industry works better than foreign suppliers can," he said.

But understanding how Detroit works is a mixed blessing these days, since Detroit presently is doing its best to change its ways. U.S. automakers, in short, want to become more like the Japanese.

U.S. automakers now are hankering for the same close relationships with their suppliers that they see working so well in Japan. Detroit wants its suppliers to get involved in developing products three years before production begins. It wants not only just-in-time (JIT) delivery but just-in-time manufacturing as well. It wants suppliers to make parts only shortly before the auto plants install them—so the automakers can give immediate feedback if the suppliers' processing needs changing.

Unfortunately for the U.S., Japanese suppliers are much more adept at such JIT manufacturing than are the Americans. "The American record in implementing JIT manufacturing is dismal," said Mr. Van Hull. Instead of synchronizing their manufacturing to the automakers', said Mr. Van Hull, "they talk about building warehouses to hold their stocks and then shipping daily."

To be fair, much of the blame for that lies with the American automakers, who only slowly are stabilizing their production schedules enough to make accurate long-range forecasts of how many parts they'll need and when. "Lack of schedule stability causes uncertainty and added costs in supplier plants," said Richard E. Dauch, Chrysler's executive vice president of manufacturing. He expects more stable schedules to account for big cost cuts for Chrysler and its suppliers.

By 1988, said Mr. Dauch, all Chrysler assembly plants will give 25-day fixed forecasts. For now, however, only two Chrysler plants have met that goal: the recently modernized Windsor, Ont., and Sterling Height, Mich., assembly plants. Ford's 30-day schedules are 98-pct fixed; their 65-day forecasts vary by 15 pct.

In marked contrast, Nissan's Tennessee plant fixes its production schedules three months in advance of production and breaks those forecasts down into daily shipment requirements two months in advance.

Japan's U.S. Plants

In the two years that the Japanese have been building vehicles in the

(Cont. on p. 35.)

Automakers Predict Steady Rise in Imported Car Parts

Percentage of car parts imported from:	1985	1990	1995
Japan	6%	8	8
Mexico	2	5	7
Europe	5	5	5
Far East	1	3	5
South America	1	2	3

Source: Arthur Andersen & Co.: *Cars and Competition: Manufacturing Strategies*. These figures are the predictions of 130 automaker executives.

U.S., they've proven that they can manage manufacturing better than their American competitors—whether the Japanese plants are run mainly by Japanese, as at the Honda plant in Marysville, Ohio; or half by Americans and half by Japanese, as at New United Motor Manufacturing, Inc. (NUMMI) at Fremont, Calif.; or mainly by Americans, as at Nissan's Smyrna, Tenn., plant.

As the three Japanese automakers have set up shop here, they've naturally tended to rely at first on their Japanese suppliers. Most Japanese automakers own minority or majority interests in their major suppliers—or at least have very close and longstanding relationships. Any supplier that wants to develop that kind of relationship first must undergo an arduous process of testing.

As the Japanese built their U.S. plants, they didn't always have the time to fully try out new American suppliers. Besides, they were building vehicles they'd already built in Japan, where they had reliable suppliers who knew exactly how to make the necessary parts. No wonder then that the Japanese weren't always interested in trying their luck with American companies that hadn't made the parts before.

But now Nissan, Honda, and NUMMI have time to consider new American suppliers. Nissan in Tennessee has increased its North American content from 40 pct to more than 50 pct since production began in 1983. NUMMI and Honda also appear open to buying more U.S. parts. Both companies are aiming for 50-pct North American content, though that includes labor.

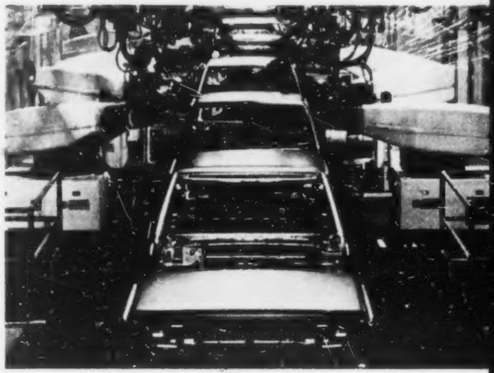
"Our goal is to consistently increase our local content," said Mr. Frinier of Nissan U.S.A. "We've set in motion local-sourcing procedures that should increase our U.S. buys on a steady basis, as in the past.

"Both Nissan U.S.A. and our parent company in Japan think that products should be made where they're sold. We have been given total freedom by our parent company to localize 100 pct of the parts used on our cars and trucks as long as they meet our standards of cost, quality, and delivery." Nissan U.S.A., for example, originally bought air ducts from Japan but now buys them from an Indiana company, Salga.

Nissan U.S.A.'s Japanese sourcing is handled by Nissan, Ltd., of Japan, which then sells the parts to Nissan U.S.A. Nissan of Japan invariably buys parts for Tennessee from the same Japanese suppliers that supply Nissan's Japanese plants. Or Nissan's Japanese plants build the parts for Tennessee.

Nissan U.S.A. now is receiving truck engines from Nissan's Kyushu plant; and car engines from its Zama plant. Nissan U.S.A. also buys Japanese transmissions and axles.

So far several Japanese suppliers have built or are building plants near Nissan's Tennessee or Honda's Ohio plant. The location of the two plants is proving a boon for Kentucky, since it's located between



Two Japanese suppliers have built plants in Tennessee to supply Nissan.

Tennessee and Ohio. Frankfort, Ky., the site of Topy's plant, is almost equidistant from Smyrna, Tenn., and Marysville, Ohio. Hitachi also is building a plant in Kentucky to supply engine coils to Nissan and other automakers.

Two Japanese suppliers have built plants in Tennessee to supply Nissan: Kantus, which supplies instrument panels and other injection-molded parts; and Calsonic, air conditioning and exhaust systems. So has an American supplier, Hoover, which supplies seats. All three of these suppliers have 100 pct of Nissan's business for these parts.

Two Japanese suppliers also have built plants in Ohio to supply Honda: Stanley Electric, which supplies lighting equipment; and Bellemar, seats, exhaust pipes, fuel lines, and mufflers.

Joint Ventures

Another supplier building a plant in Tennessee is CKR Industries, a joint venture formed this year between Chardon Rubber Co. (Chardon, Ohio) and Kinugawa Rubber Industries (Chiba-City, Japan). CKR will supply rubber parts to Nissan. Another joint venture, Sheller-Ryobi, will build a plant in Indiana to supply aluminum and zinc die castings. Ryobi, a Japanese company, owns 55 pct of the venture with Sheller-Globe (Toledo).

As automakers and suppliers manufacture more products in foreign countries, the number of joint ventures between automakers and automakers, automakers and suppliers, and suppliers and suppliers will skyrocket.

"The auto industry is turning into a great big global network," said Mr. Van Hull of Arthur Andersen. "Suppliers need to decide how they're going to fit into the network. If they're not part of it ten years from now, they're dead."

"We're increasing our spending on R&D, and we're looking for ways to hook up with suppliers around the world," said Kelsey-Hayes' Mr. Utley. Most of the large U.S. suppliers' foreign plants are joint ventures or licensees.

"We need many joint ventures with our suppliers," said Donald Kopka, Ford's vice president of design. "There are tremendous opportunities for both us and our suppliers if we get together. We're moving in that direction as fast as we can."

Equally interested are offshore suppliers. The two nations perhaps hungriest for joint ventures with U.S. suppliers today are Korea and Taiwan. Both are eager to plunge further into the world market.

"Korea cannot effectively compete with the Japanese without technical cooperations with the U.S.," said Hee Mock Noh, a senior research fellow at the Korea Institute of Economics and Technology. "Korea can offer the U.S. a base to help develop the Asian market. And Korea wants to export more goods to the U.S., Asia, and South America."

At least one American supplier, Champion Spark Plug Co., is supporting legislation to reward Japanese automakers for buying more U.S. parts.

NUMMI, the GM-Toyota joint venture, buys most of its parts from Japanese suppliers.

Champion wants to liberalize Item 807 of the U.S. tariff schedule, which allows duty-free re-entry into the U.S. of U.S.-made products. Japanese automakers buying more U.S. parts would pay lower duties on cars exported to the U.S.

In a recent press conference, George M. Galster, Champion's vice president of public affairs, called upon the Japanese automakers to buy more U.S. parts. "The primary problem lies in the traditional integration of Japanese car companies with their family of Japanese suppliers," said Mr. Galster.

But others, such as Ford Chairman Donald E. Petersen, take a different tack. "The Asians are learning how to work with us, but we haven't learned how to work with them," said Mr. Petersen. "If we want a crack at the Asian components market, we have to manufacture in Asia." Asian automakers are doing a better job of setting up joint ventures in the U.S. than vice versa, said Mr. Petersen.

Paul McCracken, the University of Michigan business professor, phrased it differently: "When you're buying from a foreigner, it's okay to speak English. But when you're selling, you better speak his language." ☐

HAS PROTECTIONISM HURT THE U.S. OR HELPED IT?

Protectionism has been the prevailing trade policy for much of the nation's past and—free trade arguments notwithstanding—the policy during many of its periods of sustained growth.

Editor's note: In this article, the first of a two-part series, Iron Age *looks at the history of U.S. trade policies and their impact on the national economy. Is the current free trade vs. protectionism debate raging throughout the land a new phenomenon? No, says* Iron Age *Steel Editor George J. McManus. Protectionism was the normal, prevailing doctrine in the U.S. during much of the 19th century and the first part of this century, a period in which the nation enjoyed "sustained, spectacular growth in ... a period of sustained protectionism."*

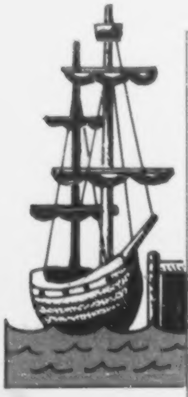
BY GEORGE J. MCMANUS

When the Smoot-Hawley Tariff Act was being debated in 1930, a group of 1,028 economists voiced strenuous opposition to the proposed tariff increases.

Despite this stand, Congress went ahead and put through steep increases. By 1931, U.S. tariffs came to a whopping 53 pct of dutiable imports. Other nations took similar protective measures and U.S. exports fell from $5.2 billion in 1929 to $2.4 billion in 1931. U.S. imports fell from $4.7 billion in 1929 to $2.7 billion in 1931.

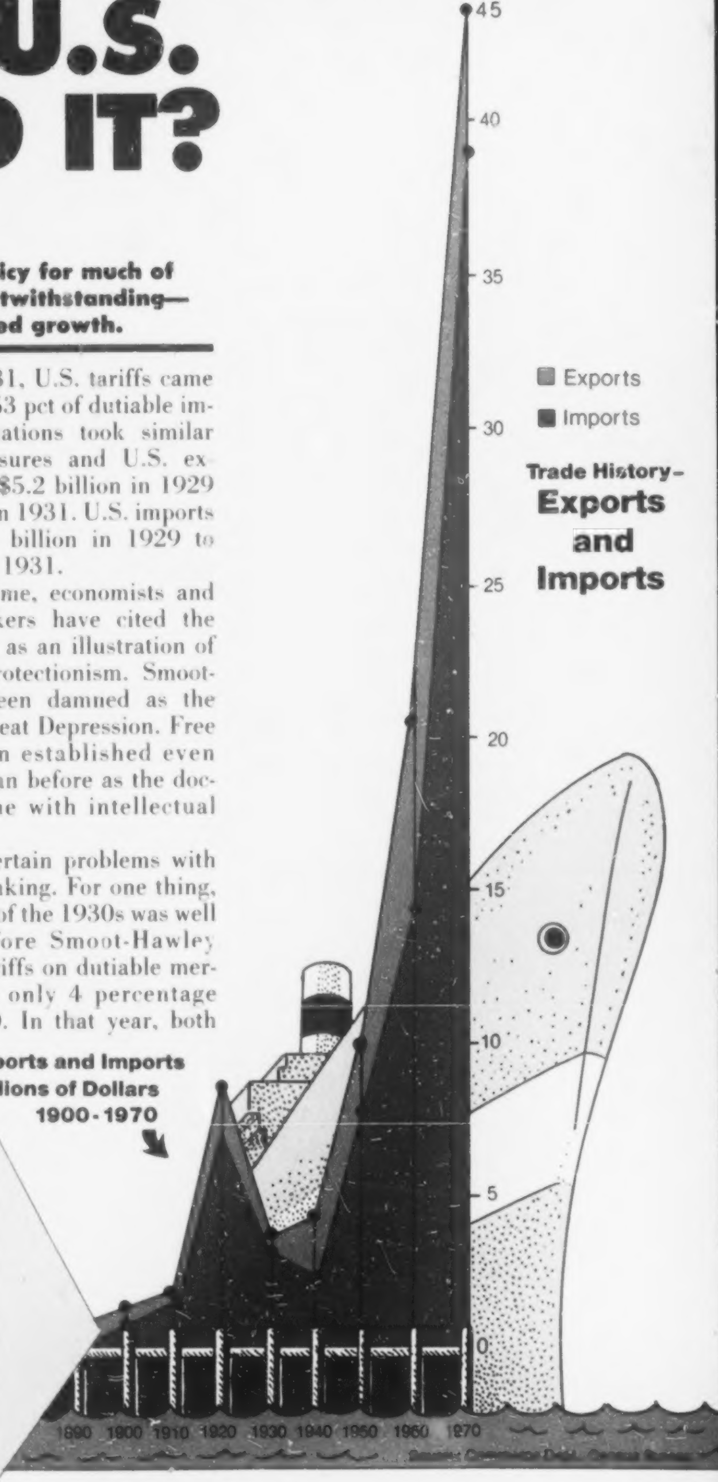
Since that time, economists and academic thinkers have cited the 1930 sequence as an illustration of the evils of protectionism. Smoot-Hawley has been damned as the cause of the Great Depression. Free trade has been established even more firmly than before as the doctrine of anyone with intellectual pretentions.

There are certain problems with this line of thinking. For one thing, the depression of the 1930s was well underway before Smoot-Hawley took effect. Tariffs on dutiable merchandise rose only 4 percentage points in 1930. In that year, both

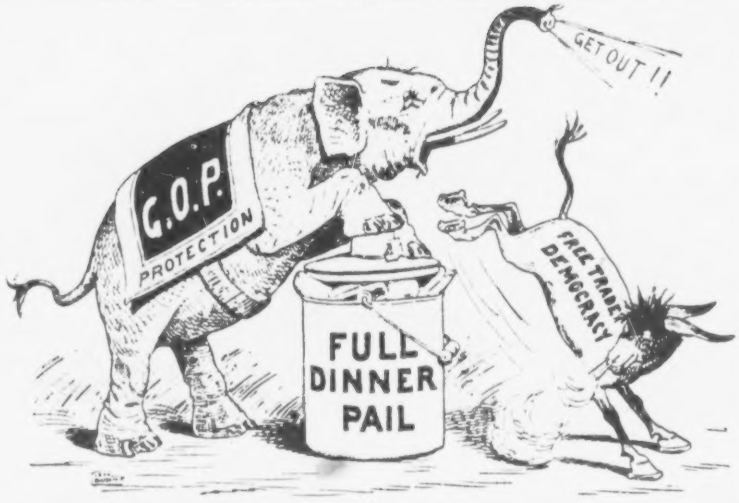


Exports-Imports: 1800-1890
Millions of Dollars

	Exports	Imports
1800	71	91
1810	67	85
1820	70	74
1830	72	63
1840	124	98
1850	144	174
1860	334	354
1870	393	436
1880	826	668
1890	858	789

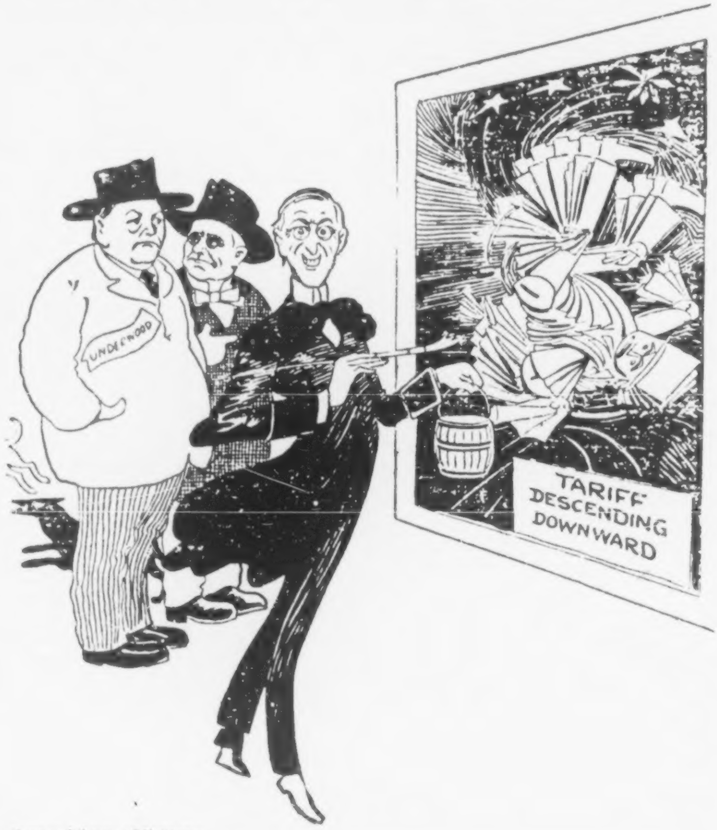


Source: Commerce Dept., Census Bureau



Source: Library of Congress

In the past, cartoonists could draw on trade to distinguish Republicans from Democrats. In a 1904 cartoon, party mascots depict the opposing views. Nine years later, President Wilson and Congressman Oscar Underwood are caricatured as creators of a measure that cut tariffs.



Source: Library of Congress

imports and exports fell by more than $1 billion. This would suggest the depression preceded the tariff increase and probably had more to do with the trade decline than the higher duties.

Apart from timing, it's hard to see how a trade reduction could have caused a massive depression when there wasn't that much trade to start with. U.S. exports came to 5 pct of Gross National Product 1929. Imports were 4.2 pct. Net exports were less than 1 pct. If all U.S. trade had been wiped out, it couldn't have produced the jobless rate of more than 20 pct in the 1930s.

Looking at it another way, U.S. exports declined by $3 billion from 1929 to 1933. It's unlikely that this subtraction could cause the drop of more than $47 billion that took place in the nation's output over the same period.

The simple fact is that the United States was essentially a self-sufficient, isolated nation in 1930. The same condition prevailed in the previous 130-odd years of the nation's existence. Except for a few brief periods, imports usually ranged between 3 and 5 pct of national product. For five years during World War II, the country survived with almost no imports—less than 2 pct.

The country's self-sufficiency was partly a matter of abundant resources, enterprising people and a lot of other advantages. It is also true, however, that the U.S. followed a highly protectionist trade policy for nearly a century and a half. In this connection, it's worth noting that Smoot-Hawley didn't represent a swing from free trade to protection. It was a change from protection to more protection. In 1929, the year before the Act was passed, tariffs on dutiable imports came to more than 40 pct.

It's worth noting that the prosperity of the 1920s was preceded by a big increase in tariffs. U.S. duties went from 16 pct in 1920 to 38 pct in 1922. This boost was followed by a decade of roaring good times.

There was the opposite reaction in 1894 when the Wilson-Gorman Act lowered tariffs from 49 pct to 40 pct. In that same year, there was the worst depression the nation had experienced until then. This may have been a coincidence, but the average person at that time didn't think so. The people voted high-tariff Republicans back into power in 1896. Acting on this mandate, the Republicans restored the 49 pct tariff rate.

It's possible that in both 1920 and 1894, the close linking of tariff actions with economic swings was coincidental. Arguments have been advanced along those lines and we, ourselves, argued the 1930 timing was accidental.

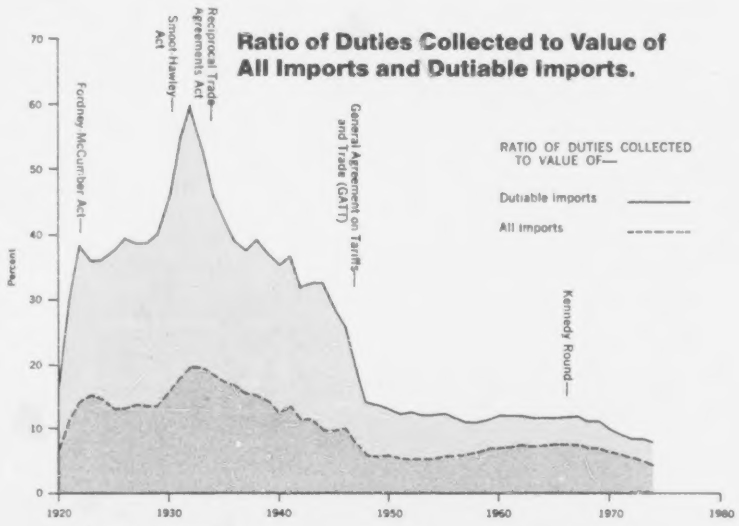
What can't be argued is that protectionism is necessarily repressive. Prosperity has followed tariff hikes. The increases may not have caused the prosperity, but they didn't automatically cause depressions.

The short-term swings can be interpreted in various ways, but there can be no quibbling over two overwhelming facts. First, the United States enjoyed sustained, spectacular growth in the 19th century and the first part of the 20th century. Secondly, this was a period of sustained protectionism.

As was the case in the 1920's, the fluctuations of trade policy in the industrial revolution were between a lot of protection and a little less protection. The first U.S. tariff act—in 1789—was fairly moderate, calling for about 8½ pct duties. Once the country got its bearings, however, tariffs were jacked up. There was a 42 pct increase in 1816. Between 1824 and 1833, four major tariff acts were approved by Congress.

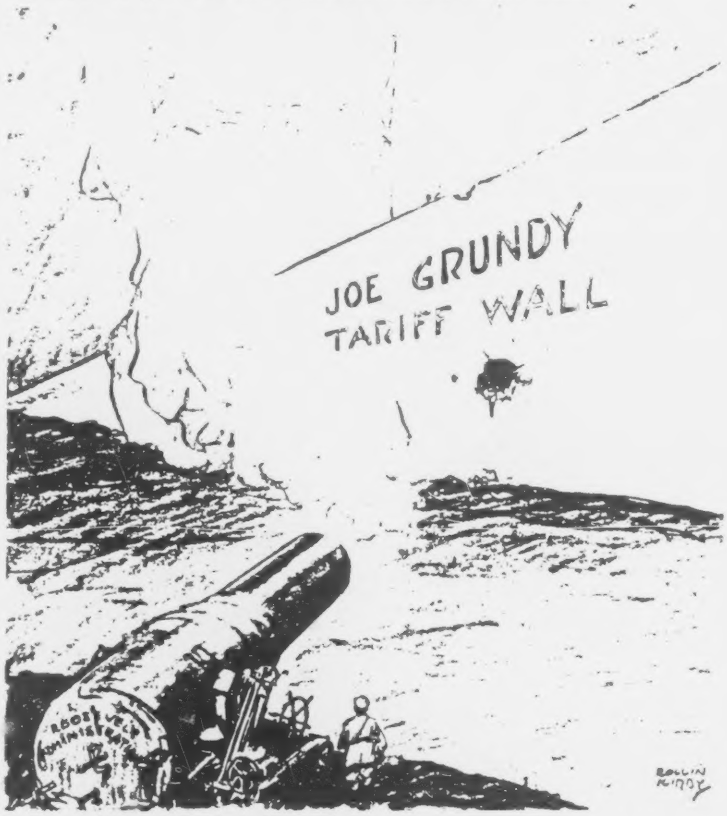
From 1821 through World War II, U.S. tariffs on dutiable goods remained above 20 pct in all but four years. In only 20 years during that period were tariffs less than 30 pct. And again, this was the period that saw an industrial colossus created. A century or so of protectionism had produced a nation that, in terms of industrial productivity, could win World War II "without really trying," says historian B. Bruce-Briggs.

The point of all this is that protectionism is not an ancient aberration, surfacing again after being discard-



Source: Library of Congress

It's been a losing battle for protectionism since the Smoot-Hawley Act of 1930. U.S. tariffs on dutiable imports have declined at a steady pace. The Roosevelt Administration, as the 1933 cartoon below indicates, leveled its guns at the Smoot-Hawley tariff wall.



Source: Library of Congress

U.S. Trade—Imports Have Surpassed Exports

In Millions of Dollars

	Exports	Pct of GNP	Imports	Pct of GNP	Tariff Rates*
1970	42,469	4	39,866	4	10
1971	43,319	4	45,579	4	9
1972	49,381	4	55,797	5	9
1973	71,410	5	70,499	5	8
1974	98,306	7	103,811	7	8
1975	107,088	7	98,185	6	6
1976	114,745	6	124,228	7	6
1977	120,816	6	151,907	7	5
1978	142,054	6	176,020	8	6
1979	184,473	8	212,028	9	7
1980	224,237	8	249,781	9	6
1981	237,019	8	265,086	9	5
1982	211,217	6	247,606	8	5
1983	200,500	6	258,000	7	5

Source: Department of Commerce, Bureau of Economic Analysis.
* On dutiable products

ed when mankind moved out of the dark ages. In terms of economic theory, the mercantile era ended with Adam Smith and David Ricardo around the end of the 18th century. As a practical matter, U.S. tariffs on imports were over 36 pct as late as 1941. Until recently, protectionism was the normal, prevailing doctrine in the U.S.

This was not a unique situation. "Trade in most countries at most times is highly regulated," wrote Mr. Bruce-Briggs in the *The Twilight of Free Trade.* "...the governors within a country are more responsive to pressures from within the country than without."

It's necessary to make these points because free trade has come to be regarded as the normal, healthy, accepted philosphy. Protectionism has become a shameful throwback to the distant past. Even those who want to be protected must avoid saying so. Steel executives must say they're for free trade, but government should do something about unfair trade of foreigners.

This inhibition contrasts sharply with the attitudes and standards of earlier times. In 1791, when the nation had little or no industry, Alexander Hamilton argued for protective tariffs. "A country should try to possess within itself all the essentials of national supply," he said.

Daniel Webster waffled a bit on the trade issue, but he wound up strongly protectionist. He offered the identical argument that is made today by domestic steel producers when people say protective measures will deprive consumers of low-priced imports. If the imports are allowed to destroy a domestic industry and eliminate domestic competition, he contended, consumers will pay high prices for the foreign products.

Abraham Lincoln believed people could buy everything they needed at home. If the rich wanted frills from Europe, he said, they should pay the extra amount represented by tariffs.

None of which means protectionism was universally endorsed in the 19th century. The Democrats were generally for free trade. The agricultural Southern states were strongly opposed to high tariffs. There were periods when free trade thinking prevailed. In 1833, with the South in need of soothing, Henry Clay engineered a compromise that called for reductions in protectionist tariffs over 10 years. It's worth noting that duties as high as 20 pct were not classed as protectionist.

There were tariff cuts in 1894 and even the Republicans under President William H. Taft supported tariff cuts in 1909. In 1913 under President Woodrow Wilson tariffs were reduced significantly.

There was occasional movement toward free trade in those periods, but this never reduced duties below the protectionist level. At all times, the cause of protection had popular support and political muscle. It was always a respectable position.

Going back still further, protection in the form of the mercantile system was dominant in the 17th and 18th centuries. The mercantile concept has remained vague, but it called for nations to accumulate as much wealth as possible by exporting a lot and importing very little.

This system fell into disrepute long ago. "For almost two centuries," said Mr. Bruce-Briggs, "The orthodox position in economics and history had been that the mercantilist policy was counter productive."

The policy was entirely rational,

he said, and nations have never abandoned the idea of maximizing exports and minimizing imports. He cited the high degree of protectionism that accompanied Japan's emergence as an industrial power.

The distinctive aspect of mercantilism, possibly, was the extent of government intervention in trade. Colonialism was the ideal vehicle for this intervention. The kinds of things that were possible in the colonial era were brought out by Britain's regulation of American trade.

A 1699 British law forbade U.S. exports of wool and wool cloth. The emigration of skilled artisans to the colonies was forbidden in 1718. American exports to any destination had to go through Britain and pay duties there. Overall, the colonies probably benefitted from trade ties with Britain, but there was no doubt that this trade was managed by the British government.

In 1776, a rationale for free trade, foreign as well as domestic, was provided by Adam Smith in *The Wealth of Nations*.

"It is the maxim of every prudent master of a family never to attempt to make at home what it will cost him more to make than buy." he wrote. "What is prudence in the conduct every private family can scarce be folly in that of a great kingdom."

Ricardo's Theory

This dictum left a big unanswered question: What if everything a country makes is more costly than the products of other countries? This difficulty was solved in 1817 by David Ricardo's theory of comparitive advantage. Many have believed this meant that some countries will always have some advantages over other countries.

That isn't the idea. Ricardo's ingenious and attractive theory said that a country could trade as long as the cost comparison between two domestic products differed from the comparison in another country. Mexico, for example, could sell transistor radios to Japan as long as the two countries had different ratios between radios and soybeans.

Anyway, a theoretical base was provided for free trade and this doctrine gained an academic constituency that has remained intact since then. "To be a trained economist," said Mr. Bruce-Briggs, "is to be taught that free trade is the only respectable and reasonable theory of international exchange of commodities. To advocate anything other than a continuation of free trade policy is to be stupid, contemptible and dangerous."

How much immediate impact Ricardo had in the real world is uncertain. Great Britain did begin moving toward free trade in 1815 with a series of acts that included repeal of the Corn Laws in 1846 and culminated in 1860 with removal of the last import duty—on silk.

While these actions closely followed Ricardo's theory, they also came at a time when Britain had become an industrial and financial powerhouse. The country's industrial development gave it an absolute advantage over foreign competitors. Britain had become the financial clearinghouse for all trade. In short, it was in the nation's interest to promote as much trade as possible.

After World War II, the U.S. advocacy of free trade certainly came with the nation in a commanding economic position. The industries of Britain, Japan, and Germany had been bombed and battered. It is not true that the Marshall plan and the free trade push were designed just to sell tractors abroad. The U.S. adopted policies that facilitated a flow of equipment abroad mostly because it was the right thing to do.

The U.S. was, however, in a position to benefit from the postwar trade and it certainly seemed unthinkable that the nation could ever be hurt by foreign trade.

Accordingly, the U.S. took the lead in eliminating protective barriers. The first steps in this direction actually were taken in the 1930s under President Franklin D. Roosevelt. The Reciprocal Trade Agreements Act of 1934 authorized the President to negotiate bilateral trade agreements. Until then, all tariffs had been set by Congress and had been applied across the board in a unilateral manner.

By the middle of World War II, a total of 30 bilateral agreements with 24 nations had been signed. The most important of these was the reciprocal treaty signed with Great Britain in 1938.

In 1945, the Trade Agreements Extension Act authorized President Harry Truman to reduce tariffs 50 pct and to enter into multi-national negotiations. In 1947, representatives from 23 nations met in Geneva and spent seven months drawing up the General Agreement on Tariffs and Trade (GATT). This consisted on 123 trade agreements covering some 50,000 commodities.

The GATT talks produced the most decisive tariff cuts in U.S. history. From over 31 pct in 1944, U.S. rates on dutiable products fell to under 14 pct in 1948.

In 1964, the Kennedy Round of GATT talks began negotiations which were to last three years. These reduced tariffs on non-farm products 35 pct and those on farm products 20 pct. When the new agreements had been implemented, the average rates were:

—U.S. - 9.9 pct;
—UK - 10.8 pct;
—EEC - 8.6 pct, and
—Japan - 10.7 pct.

In 1971, the U.S. had its first negative trade balance since 1895. From $2.2 billion in 1971, the trade deficit grew to more than $100 billion in 1984. It will probably reach $130 billion in 1985.

In response to this worsening, the U.S. remedy has been more of the same. Tariff rates were cut from 10 pct in 1970 to 5 pct in 1983. This performance seems to refute the charge that nations embrace free trade only when it is in their interest. The U.S. has continued to press for larger doses of free trade in the face of continued losses. ☐

In its December 6 issue, Iron Age *will talk with leading manufacturing and government experts responsible for grappling with the nation's current trade crisis to determine how they will deal with it.*

PRICE & PRODUCTION DATA

(Effective October 7,1985)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	170	163	182	135
Pittsburgh	155	146	149	204
Youngstown	99	99	91	95
Lake Erie	146	140	113	145
Detroit	141	138	147	130
Chicago	493	475	491	344
Cincinnati	84	91	90	82
St. Louis	80	77	72	76
Southern	181	180	182	151
Western	76	68	74	65
U.S. Production	1,625	1,577	1,591	1,427

Source. American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural	gross-ton 59.4*
Pellets (per iron unit natural	gross-ton 72.5-86.9**
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53***

*59.4¢—Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports.

**72.5¢—U.S. Steel as of 8/16/85. **86.9¢—Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs, 2/26/82. ***Effective 8/1/83.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective October 7,1985)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,625	1,577	67,203	72,615
Capability Utilization Rate	63.9	61.9	65.9	70.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	27.582
Pig Iron** (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 71.50	$ 71.17	$ 72.83	$ 83.50
No. 2 bundles	$ 52.50	$ 52.50	$ 53.17	$ 51.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 73.50	$ 73.50	$ 75.50	$ 88.50
No. 1 steel, Philadelphia	68.50	68.50	70.50	80.50
No. 1 steel, Chicago	72.50	71.50	72.50	81.50
No. 1 bundles, Detroit	66.50	67.50	69.50	75.50
Low Phos., Youngstown	69.50	70.50	70.50	78.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	71.50
No. 1 mach'y cast., Phila	91.50	91.50	92.50	98.50
No. 1 mach'y cast., Chi	99.50	99.50	99.50	113.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective October 7,1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	44.76	44.67	10/ 7/85
Copper (C)	66.00	65.50-66.00	10/ 2/85
Lead	19.00-20.00	18.50-20.00	10/ 4/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	200.33	201.05	10/ 7/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00	41.00	9/24/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00-1.25
Calcium, ton lots, crown	$3.76
Chromium, 99.8%	$3.75
Cobalt, 99%, cathode	$12.50
Gold per troy oz.	$326.00
Indium, dollars per troy oz.	$2.50
Iridium, dollars per troy oz.	$440.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb. f.o.b. N.Y.	$320.00-330.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$6.85
Nickel electro (PDCR)	$3.29
Palladium, per troy oz.	$103.00
Platinum, per troy oz.	$318.00
Rhodium, per troy oz.	$1,075.00
Silver ingots, per troy oz.	$6.29
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Sept. 30—560.82
Oct. 1—557.33
Oct. 2—559.21
Oct. 3—556.47
Oct. 4—556.47

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	59	$48\frac{1}{2}$
Yellow brass	$52\frac{1}{8}$	$42\frac{3}{4}$
Red brass	$55\frac{3}{8}$	$44\frac{3}{4}$
Comm. bronze	$56\frac{1}{2}$	$45\frac{1}{8}$
Mang. bronze	$44\frac{3}{4}$	$43\frac{3}{4}$
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	56
No. 2 copper wire	48
Light copper	39

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	52
No. 2 copper wire	44
Light copper	35
No. 1 composition	46
No. 1 comp. turnings	44
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	30
Radiators	35

Aluminum

New mixed clips	33	— 34
Old sheet	30	— 31
Old cast	30	— 31
Clean dry borings	31	— 32

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	24	— 26
Mixed L.C. clips	21	— 22
Old sheets and cast	20	— 21
Borings and turnings	16	— 18
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 39
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	115	—125
Nickel rod ends	115	—125
Nickel sheets, clips	115	—125
Nickel turnings	25	— 35

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

NOTICE: Cleveland and Youngstown scrap price reporting change

Iron Age will change its method of reporting scrap prices in **Cleveland** and **Youngstown** from consumer delivered prices to broker buying prices beginning with the effective date of Nov. 11. Those prices will appear in the Dec. 6 issue.

Much of the scrap in Cleveland and Youngstown is shipped to consumers in other cities. Broker buying prices more accurately reflect the variety of markets for Cleveland and Youngstown scrap. Also on Nov. 11 *Iron Age* will reduce the range in prices for Cleveland and Youngstown from $3 to $1. In addition, *Iron Age* will no longer list the Cleveland prices of mixed borings and turnings, drop forge flashings, steel axle turnings, railroad cast, cupola cast, and stove plate, since the volume of business in these grades is minimal. However, *Iron Age* will begin listing Cleveland prices for (1) mixed cast and (2) plate and structural steel, five feet and under.

In August and September, *Iron Age* raised the prices of many grades of Cleveland scrap to align them more closely with consumer delivered prices. For some of these grades, the actual market prices did not rise as much as the *Iron Age* prices did. *Iron Age* welcomes written comments regarding these changes. Write to Michael Marley, Managing Editor, Iron Age, Chilton Co., Chilton Way, Radnor, Pa. 19089.

EFFECTIVE OCTOBER 7, 1985

(Effective October 7, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 73.00 to	$ 74.00
No. 2 hvy. melting	63.00 to	64.00
No. 1 dealer bundles	88.00 to	89.00
No. 1 factory bundles (auto)	88.00 to	89.00
No. 2 bundles	54.00 to	55.00
No. 1 busheling	86.00 to	87.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	38.00 to	39.00
Low phos. punchings plate	90.00 to	91.00
Heavy turnings	63.00 to	64.00
No. 1 RR hvy. melting	80.00 to	81.00
Rails, 2 ft. and under	96.00 to	97.00
Scrap rails, random lgth	80.00 to	81.00
RR specialties	92.00 to	93.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	64.00 to	65.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	555.00 to	565.00
18-8 turnings	455.00 to	465.00

Chicago

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	65.00 to	66.00
No. 1 dealer bundles	86.00 to	87.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	59.00 to	60.00
No. 1 busheling	83.00 to	84.00
Shredder scrap	83.00 to	84.00
Machine shop turnings	41.00 to	42.00
Mixed borings and turnings	43.00 to	44.00
Shoveling turnings	45.00 to	46.00
Cast iron borings	45.00 to	46.00
Low phos. forge crop	95.00 to	96.00
Low phos. punchings plate 1/4 in. and heavier	111.00 to	112.00
Low phos. 2 ft. and under	106.00 to	107.00
No. 1 RR hvy. melting	76.00 to	77.00
Scrap rails random lgth	82.00 to	83.00
Reroller rails	107.00 to	108.00
Rails, 2 ft. and under	105.00 to	106.00
RR couplers and knuckles	92.00 to	93.00
RR car axles	111.00 to	112.00
No. 1 machinery cast	99.00 to	100.00
Cupola cast	87.00 to	88.00
Stove plate	89.00 to	90.00
Steel car wheels	89.00 to	90.00
Stainless		
18-8 bundles and solids	540.00 to	550.00
18-8 turnings	455.00 to	465.00
430 bundles and solids	150.00 to	155.00
430 turnings	120.00 to	125.00

Philadelphia

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	58.00 to	61.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	42.00 to	45.00
No. 1 busheling	80.00 to	83.00
Shredder scrap	82.00 to	85.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	76.00 to	79.00
Low phos. 2 ft. punchings	97.00 to	100.00
Electric furnace bundles	87.00 to	90.00
RR specialties	76.00 to	79.00
Rails, 2 ft. and under	100.00 to	103.00
Cupola cast	76.00 to	79.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	90.00 to	93.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	51.00 to	52.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	29.00 to	30.00
No. 1 busheling	65.00 to	66.00
Drop forge flashings	41.00 to	42.00
Machine shop turnings	40.00 to	41.00
Mixed borings and turnings	19.00 to	20.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	23.00 to	24.00
Heavy breakable cast	34.00 to	35.00
Mixed cupola cast	49.00 to	50.00
Automobile cast	73.00 to	74.00
Stainless		
18-8 bundles and solids	505.00 to	515.00
18-8 turnings	380.00 to	390.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	56.00 to	59.00
No. 1 dealer bundles	73.00 to	76.00
No. 2 dealer bundles	31.00 to	34.00
Machine shop turnings	24.00 to	27.00
Shoveling turnings	24.00 to	27.00
Low phos. plate	68.00 to	71.00
Electric furnace bundles	72.00 to	75.00
Galvanized bundles	64.00 to	67.00

Cleveland

No. 1 hvy. melting	$ 55.00 to	$ 58.00
No. 2 hvy. melting	46.00 to	49.00
No. 1 dealer bundles	77.00 to	80.00
No. 1 factory bundles	68.00 to	71.00
No. 2 bundles	29.00 to	32.00
No. 1 busheling	75.00 to	78.00
Machine shop turnings	16.00 to	19.00
Mixed borings and turnings	7.00 to	10.00
Shoveling turnings	24.00 to	27.00
Cast iron borings	17.00 to	20.00
Cut structural & plates, 2 ft. and under	100.00 to	103.00
Low phos. punchings plate	100.00 to	103.00
Drop forge flashings	53.00 to	56.00
Foundry steel, 2 ft. & under	69.00 to	72.00
No. 1 RR hvy. melting	63.00 to	66.00
Rails, 2 ft. and under	90.00 to	93.00
Rails, 18 in. and under	94.00 to	97.00
Steel axle turnings	57.00 to	60.00
Railroad cast	89.00 to	92.00
No. 1 machinery cast	88.00 to	91.00
Cupola cast	55.00 to	58.00
Stove plate	54.00 to	57.00
Stainless		
18-8 bundles	495.00 to	505.00
18-8 turnings	375.00 to	385.00
430 bundles	90.00 to	100.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	43.00 to	44.00
No. 1 busheling	67.00 to	68.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	30.00 to	31.00
Machine shop turnings	16.00 to	17.00
Mixed boring and turnings	16.00 to	17.00
Shoveling turnings	22.00 to	23.00
Cast iron borings	24.00 to	25.00
Low phos. plate	75.00 to	76.00
Structural and plate, 2 ft. and under	79.00 to	80.00
Rails, 2 ft. and under	79.00 to	80.00
Scrap rails, random lgth	64.00 to	65.00
No. 1 machinery cast	77.00 to	78.00
No. 1 cupola cast	59.00 to	60.00

St. Louis

No. 1 hvy. melting	$ 45.00 to	$ 46.00
No. 2 hvy. melting	34.00 to	35.00
Foundry steel, 2 ft.	39.00 to	40.00
No. 1 dealer bundles	45.00 to	46.00
No. 2 bundles	30.00 to	31.00
Machine shop turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	53.00 to	54.00
Rails, random length	59.00 to	60.00
Rails, 18 in. and under	72.00 to	73.00
RR specialties	70.00 to	71.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	89.00 to	90.00
Steel car wheels	81.00 to	82.00
Rerolling rails	69.00 to	70.00
Unstripped motor blocks	64.00 to	65.00

Birmingham

No. 1 hvy. melting	$ 73.00 to	$ 74.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	73.00 to	74.00
No. 2 bundles	48.00 to	49.00
No. 1 busheling	73.00 to	74.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	25.00 to	26.00
Shoveling turnings	39.00 to	40.00
Cast iron borings	38.00 to	39.00
Electric furnace bundles	66.00 to	67.00
Elec. furnace, 3 ft. & under	69.00 to	70.00
Structural and plate, 2 ft.	90.00 to	91.00
Structural and plate, 4 ft.	85.00 to	86.00
No. 1 RR hvy. melting	85.00 to	86.00
Scrap rails, random lgth	77.00 to	78.00
Rails, 2 ft. and under	90.00 to	91.00
Angles and splice bars	84.00 to	85.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	74.00 to	75.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	15.00 to	16.00
Low phos. 18 in. and under	79.00 to	80.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	74.00 to	75.00
No. 1 cupola cast	59.00 to	60.00
Heavy breakable cast	24.00 to	25.00
Drop broken cast	71.00 to	72.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	490.00 to	500.00
18-8 turnings	390.00 to	400.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	17.00 to	19.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	13.00 to	14.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 82.00
No. 2 hvy. melting, cut 2 ft. and under	72.00
No. 1 dealer bundles	83.00
No. 2 bundles	58.00
Mixed steel scrap	53.00
Bush. new fact. prep'd	83.00
Bush. new fact. unprp'd	64.00
Machine shop turnings	35.00
Short steel turnings	35.00
Mixed borings and turnings	20.00
Cast scrap	89.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	54.00 to	55.00
No. 2 bundles	40.00 to	41.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	30.00 to	31.00
Shredder scrap	74.00 to	75.00
Cut structural plate, 2 ft. and under	97.00 to	98.00
Cut structural plate, 5 ft. and under	79.00 to	80.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	83.00 to	84.00

PRODUCER KEY
With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens, Inc., Coatesville, Pa.

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Nelsen Steel & Wire Co., Chicago
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
F15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., North Tonawanda, N.Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Corp., Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh

W3 Weirton Steel Corp., Weirton, W. Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh
W14 Whittar Steel Strip Div., Whittar Industries, Ltd., Detroit

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to *Iron Age* by a number of metal service centers deemed representative by *Iron Age* and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
City Delivery Charge*	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	24.79	30.61	33.60	27.11	24.88	23.22	21.05	28.73	31.43	45.15	59.50	67.56
Baltimore	24.79	28.97	34.02	31.60	30.35	28.49	23.78	33.08	46.54	51.09	59.10	66.46
Birmingham	23.42	27.62	33.60	26.90	23.68	23.33	22.35	29.13	43.72	49.95	60.60	67.74
Boston	31.59	37.08	43.12	42.00	31.23	29.70	25.01	32.57	38.73	40.76	51.57	55.65
Buffalo	28.59	33.52	39.73	34.70	28.37	25.84	21.26	30.07	37.80	38.76	46.48	53.50
Chicago	26.49	32.81	36.03	24.69	21.92	20.59	19.30	24.99	29.30	36.60	44.26	49.91
Cincinnati	27.32	32.94	35.92	25.42	24.66	19.88	18.68	26.34	31.24	37.71	44.52	49.89
Cleveland	26.20	32.71	35.64	28.06	24.19	22.15	19.05	28.25	34.10	37.75	44.76	51.24
Denver	28.91	35.17	34.44	31.85	26.86	24.20	21.49	35.39	44.04	51.11	59.29	64.85
Detroit	27.06	33.16	36.33	24.62	24.66	20.50	19.06	26.32	31.14	37.38	44.57	50.47
Houston	25.45	27.06	30.33	33.87	24.72	24.31	22.05	36.65	42.12	42.29	55.65	62.74
Kansas City	28.25	34.67	36.90	27.32	25.35	21.25	18.40	30.97	36.41	40.14	46.87	51.81
Los Angeles	24.86	29.24	35.08	29.36	26.27	32.05	27.09	34.71	46.00	51.34	59.30	66.40
Memphis	22.36	30.60	31.64	27.36	24.43	24.15	21.65	30.50	33.71	44.50	56.48	64.86
Milwaukee	26.66	32.57	35.82	26.71	24.99	21.28	19.27	25.16	32.23	37.07	43.78	49.90
New York	29.82	36.09	40.14	37.84	30.67	25.04	22.47	33.05	36.74	41.73	46.90	52.12
Philadelphia	25.80	32.64	38.45	38.58	27.96	26.10	22.25	29.00	37.35	42.37	51.95	57.27
Pittsburgh	36.58	38.19	42.78	34.68	33.37	27.78	25.62	27.40	35.31	39.45	46.84	51.06
Portland	26.61	29.47	36.46	31.87	32.56	34.45	27.54	37.58	46.18	51.95	65.57	.....
San Francisco	24.76	29.74	35.87	29.52	25.69	29.86	27.16	35.30	47.99	51.84	59.35	66.40
Seattle	26.00	28.24	35.47	28.38	21.37	27.40	27.15	35.25	43.61	52.61	65.62	66.15
Spokane	21.04	28.65	28.65	32.74	32.02	33.63	23.45	36.94	39.45	42.47	.....	55.15
St. Louis	26.74	29.84	29.84	27.19	23.57	19.95	19.63	29.16	34.95	38.39	45.11	50.75
St. Paul	26.53	31.58	31.58	31.29	23.67	26.52	19.13	28.60	34.40	37.59	44.36	50.29

Base Quantities. All HR products may be combined for quantity. Hot rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—1/8" x 1"; Plate 1/4" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds 3/4-2-15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1-5/8" round; Cold drawn—1" round; Hot-rolled 4140—1- 5/8" round. Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

Codes identify Producers listed on p. 94. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(2)	$473.00
C10, U1	$473.00
R3	$453.00
Midwest	
R3, W5	$453.00
U1	$473.00
S1, I3	$473.00
C10	$473.00
K2	$473.00
West	
C6	$420.00
Alloy, East	
R3	$492.00
B3	$512.00
U1, C10	$512.00
Midwest	
W5	$492.00
U1, I3	$512.00
C10	$512.00
R3	$492.00
S1	$512.00
West	
C6	$469.00

Structurals

Carbon, East	
B3	22.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3	23.90
T10	23.90
N4	23.90
South	
C16	23.90
T10	22.90
High-Strength, Low Alloy, East	
B3	22.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
South	
C16	23.90
Wide Flange. Carbon, East	
B3	22.90
U1	22.75
J3	23.90
Midwest	
U1	22.75
N4	23.90
I3	23.90
Wide Flange, High Strength-Low Alloy, East	
U1	24.30
Midwest	
U1	24.30

Strip

Hot-Rolled, Carbon, Cut II Edge—all widths, East	
U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1	23.75
U1, A7	23.75
I3, B3	23.75
M2	22.05
R3	22.05
South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
S10	29.60
P15	24.80
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge. All widths, (plus extras)*	
Midwest	
M2, R3	22.05
W3, J3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge	
Midwest	
S1	37.05
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	26.10
I4	25.20
Alloy, Cold-Rolled East (plus extras)*	
E4,M8	43.35
B4	49.75
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	23.75
J3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5	23.75
S1, B3	23.75
I3, A7	23.75
West	
U1	24.25
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2)	28.15
J3	26.15
U1	28.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.85
J3	26.15
D1	26.15
U1, W5	28.15
S1, B3	28.15
I3, A7	28.15
West	
U1	28.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	30.30
U1	30.30
Midwest	
J3, D1, W3	28.00
R3, Y1	28.00
G2, M11	30.00
U1, W5	30.30
S1	30.30
I3	30.30
A7	30.30
West	
U1	30.80
South	
R3	28.00
Enameling, Midwest	
U1, S1	29.65
I3, A7	29.65
J3	27.65
Long-Terne, Midwest	
W5, A7, U1	31.65
R3	29.35

Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate Single Reduced (70 lb)	
East	per base box
J3	26.29
U1	30.12
Midwest	
U1	30.12
J3	26.29
M11	27.54
W3	26.29
W5	28.99
West	
U1	30.62
South	
U1	30.12
Double Reduced (55 lb)**	
Midwest	
M11	21.95
J3	21.49
U1	24.33
W3	21.49
W5	23.38
West	
U1	24.83
South	
U1	24.33
Black Plate Single Reduced (70 lb)*	
East	
B3	24.81
Midwest	
J3, W3	24.01
I3	24.57
W5	25.55
U1	26.55
M11	26.27
West	
U1	26.55
Double Reduced (55 lb)	
East	
B3	20.49
Midwest	
U1	21.32
M11, W5	20.49
W3, J3	18.93
West	
U1	21.32
South	
U1	21.32

*75 lb—base weight extra 69¢
**50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3, R5	25.80
J3	25.80
U1	27.05
C10	27.05
B3	27.05
Midwest	
I4	26.00
U1, I3	27.05
R3, T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
C16	25.80
Cold Finished Carbon, East	
A11	22.15
R3	33.75
T11, S8	31.00
J3(4), L2	31.00
M8, W10	31.00
N1	24.475
R4, B4	33.25
C10	31.00
Midwest	
W10, R3	33.25
J3	31.00
B1	33.45
L2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
West	
R3	37.15
South	
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
R5, K3	27.95
R3, J3	27.95
U1	29.20
B3	29.20
C10	29.20
Midwest	
R3	27.95
I3, C10, U1	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold-Drawn, East	
L2	35.20
R3, N1	37.90
R4	37.10
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
Midwest	
R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
L2	34.85
B5, M9	38.60
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3	23.25
L4, U1	25.75
P2	23.25
J3	26.75
Midwest	
B3	23.25
I3	25.75
J3, A7	22.80
U1, I4, S1	25.75
R3	26.75
West	
U1	25.75
O2	23.00
South	
R3	25.75
U1	25.75
Alloy East	
B3	31.05
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	31.05
I4, U1	33.55
West	
O2	31.00
South	
U1	33.55

Wire

Carbon Steel Wire, East	
B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

UNEVEN ORDERS GAINS STILL TRIGGER HOPES

The rise in durable goods orders in August was a solid one. Orders were up 2.6 pct from the previous month.

Still, the orders rise wasn't as clear a sign of health as might be noted at first glance. The orders gain was too lop-sided.

Total new orders for durable goods increased by $2.7 billion to $107 billion during the month. But orders received by a single industry group, transportation equipment, rose by $2.8 billion in August. This strong 10.6 pct rise was accounted for by big gains in motor vehicles and aerospace products.

In other words, sales incentives in the auto industry and contracts for military aircraft almost singularly gave the big upward push to orders in August. Beyond these industry categories, orders showed slight gains and moderate declines.

Orders received by the primary metals industry were up 2.6 pct in August. All of this gain was accounted for by the steel industry. Orders for nonferrous metals lagged during the month.

Orders for electrical machinery were soft in August. Incoming orders in this industry group were down about 3 pct.

One point came through clearly in the U.S. Commerce Department announcement on orders, shipments and inventories: Durable goods producers are still sitting tight on their inventories.

Inventories declined fractionally during the month in the face of rises of 2.6 pct in both orders and shipments. The tight hold on stocks covered both work in process and finished goods.

Perhaps, the most hopeful sign in the August report was a 3.6 pct rise in orders for nondefense capital goods. This was especially good news because orders for these goods had tumbled in July.

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted **Source: U.S. Dept of Commerce**		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	4th Qtr*	$395.3	$392.6	$367.2
Manufacturing, Total	4th Qtr*	161.9	160.8	146.2
Manufacturing, Durable Goods	4th Qtr*	77.5	77.8	71.1
Mining Industry	4th Qtr*	15.9	16.2	16.9
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	Aug.	107.0	104.4	101.9
Shipments	Aug.	105.2	102.5	100.3
Inventories	Aug.	191.8	192.2	187.0
Unfilled Orders	Aug.	352.9	351.1	350.3
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	Aug.	27.6	26.7	24.7
Capital Goods Producers Defense Industries	Aug.	10.0	9.6	8.1
Primary Metals, Total	Aug.	10.9	10.6	10.8
Steel (SIC 331)	Aug.	4.9	4.5	4.4
Iron & Steel Castings (SIC 332)	Aug.	1.3	1.2	1.3
Nonferrous Metals	Aug.	4.7	4.9	5.1
Nonelectrical Mach.-Equip. Industries, Total	Aug.	17.9	17.8	17.7
Engines & Turbines	Aug.	1.3	1.3	1.2
Farm Machinery & Equipment (Shipments)	Aug.	0.9	0.8	0.8
Construction, Mining & Mat. Hdlg. Equip	Aug.	2.9	3.0	2.6
General Industrial Machinery	Aug.	1.3	1.3	1.5
Fluid Power Equipment** (Index-1972=100)	Aug.	256.0	253.0	281.0
Metalworking Machinery	Aug.	0.8	1.0	0.9
Machine Tools, Total ($Mill., Unadjusted)***	Aug.	183.9	199.9	200.6
Machine Tools, Metalcutting***	Aug.	130.2	149.9	135.0
Machine Tools, Metalforming***	Aug.	53.7	50.0	65.6
Electrical Mach. & Equip. Industries, Total	Aug.	14.7	15.2	16.2
Elec. Transmission Equip. & Ind. Apparatus	Aug.	2.2	2.1	2.1
Household Appliances	Aug.	1.3	1.4	1.4
Communication Equipment	Aug.	5.2	5.0	6.1
Transportation Equipment, Total	Aug.	29.6	26.7	25.5
Motor Vehicles & Parts (Shipments)	Aug.	17.1	15.8	16.9
Aircraft, Missiles & Parts	Aug.	11.0	9.3	7.6
Shipbuilding & Military Tanks	Aug.	0.4	1.1	0.6
Fabricated Metal Products, Total	Aug.	14.7	14.2	11.9
Instruments, Total	Aug.	4.6	5.0	4.6

*Est.—Commerce Dept; **Source: National Fluid Power Assn.; ***Source: NMTBA.

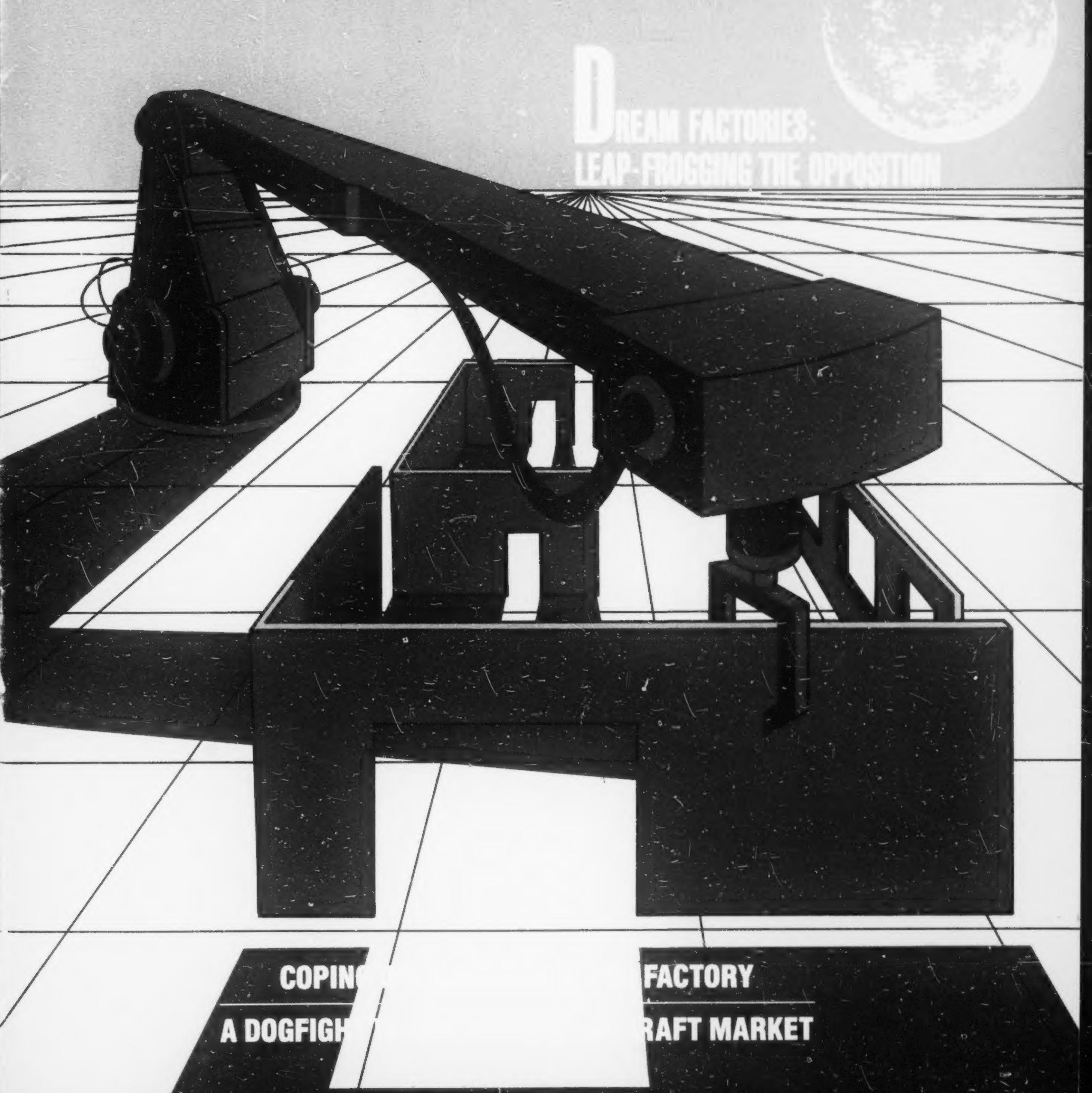
c2150-8

CHILTON'S

November 15, 1985

IRONAGE

MANUFACTURING MANAGEMENT



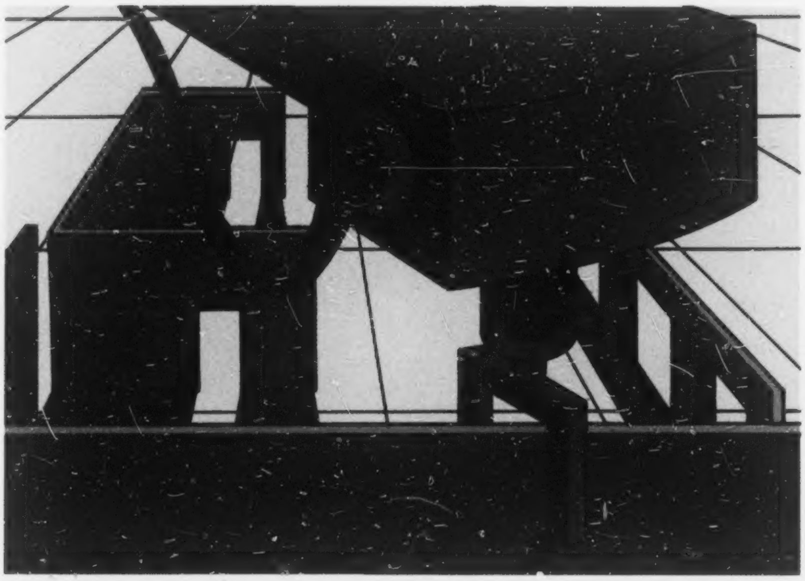
DREAM FACTORIES:
LEAP-FROGGING THE OPPOSITION

COPIN FACTORY

A DOGFIGH RAFT MARKET

NOVEMBER 15, 1985 VOL. 228, NO. 22

CHILTON'S
IRON AGE
MANUFACTURING MANAGEMENT



Editorial 7
When push comes to shove, et al.

Newswatch 13
Japan is accused of flooding the U.S. with aluminum can stock.

Machine Tool Report 22
A West German tool builder has its eye on American job shops.

You And Your Job 25
Materials engineers can work and go to school for an advanced degree.

Dream Factory 26
Some manufacturers are converting yesterday's operations into tomorrow's.

Hi-Tech Management 41
Corporate success can depend on how well new technology is handled.

Aircraft 51
European airframe builders are landing in the U.S. market.

Composites 65
Composite parts are shaping up in three dimensions.

Technically Speaking 70
The Air Force is looking for better ways to make tail sections.

Materials Report 79
A new steel trade accord is expected between the U.S. and Europe.

Price Trends 84
Automobiles lead a new wave of price cuts.

Next Issue: Fabricating Composites

Departments

EDITORIAL STAFF 8
LETTERS 8
INDUSTRIAL BRIEFS 19
PRODUCT & EQUIPMENT REVIEW 72
BUSINESS STAFF 74
AD INDEX 74
MANAGEMENT SERVICE CARD 75
P&P DATA 10/21 80
FERROUS SCRAP 10/21 81
CLEARING HOUSE 82

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$42 one year, $69 Canada/Foreign (24 issues); Metalsproducer U.S. edition—$24 one year (12 issues); $27 one year (6 issues). Single copies, $2.50. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077.

Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES

A DOGFIGHT RAGES IN THE MID—SIZED AIRCRAFT MARKET

Smaller European airframe manufacturers have been carving out a niche in the commercial airframe manufacturing market.

BY AL SENIA

There is a new dogfight brewing in the skies over America.

The impending battle involves market share for smaller passenger airplanes. It pits small, plucky European companies against the two traditional U.S. giants of commercial aviation.

And when the smoke clears, the ramifications could be major for the aerospace industry, which has long been dominated by American manufacturing expertise but is becoming more internationalized.

With little fanfare, smart marketing and a good deal of lucky positioning, smaller European airframe manufacturers like British Aerospace and Netherlands-based Fokker Aviation have been carving out a niche in the commercial airframe manufacturing market.

The Europeans recently scored breakthrough sales of new, 100-seat airplanes to U.S. airline companies like Piedmont Airlines, USAir, California-based Pacific Southwest Airlines (or PSA) and other regional airlines that sprang up in the aftermath of U.S. airline deregulation.

The new airplane sales have come at the direct expense of the two major U.S. commercial airframe manufacturers, Boeing Commercial Airplane Co. in Seattle and Douglas Aircraft, the McDonnell Douglas Corp. subsidiary based in Long Beach, Calif.

The two American companies are planning separate, multi-million doller counterattacks against Fokker and British Aerospace so that they do not surrender an important segment of the manufacturing market. Both firms are moving toward launching derivative, down-sized versions of popular, existing airplanes: The Boeing 737 and the Douglas MD-80.

But the latest competitive wave occurs during a period when the worldwide aircraft industry and its suppliers have been emerging from a steep recession that saw orders for new airplanes plummet in 1983 and only slightly improve last year.

The new, unexpected competition also comes at a time when the industry has been beset by stiff competition for sales, a continuing overabundance of used commercial airplanes and the emergence of another key overseas player, Europe's Airbus airframe manufacturing consortium.

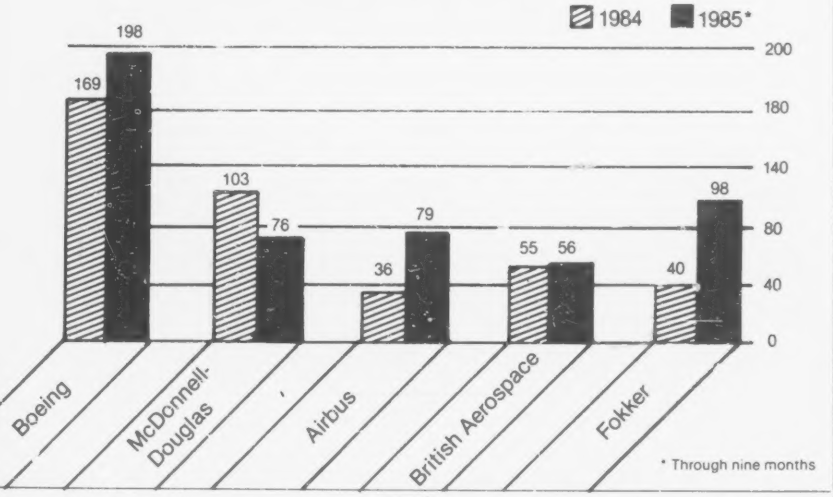
Airbus has sold 82 airplanes in the first nine months of this year, more than double its sales for all of 1984. These include 31 of the all-new technology A-320 airplane, a 150-seat, single aisle, short- to medium-range passenger twinjet that will not make its first flight until the spring of 1987.

Airbus scored a coup in May when Pan Am, a major U.S. airline, signed a $1.1 billion contract to purchase 28 A-310 and A-320 aircraft.

(Cont. on p. 54.)

Flying the Competitive Skies

Firm Orders for New Aircraft (In Units)



* Through nine months

The only other major U.S. airline Airbus has made inroads with is Eastern. In early October, Continental Airlines ordered three new A-300 transports and three used Airbus planes for delivery in 1986. The $176 million order is subject to bankruptcy court approval.

Right place, right time

Airline company executives say what is happening to American companies in the aviation industry isn't much different than what happened to U.S automakers earlier in this decade: Market conditions changed and overseas automakers benefitted from having smaller, more fuel efficient alternative products available for immediate purchase.

Only this time, the suppliers were European. Fokker Aircraft in August stunned the aviation community with the largest sale in the company's history: a $350 million order from USAir for 20 new Fokker 100s, a medium-range jet powered by two Rolls Royce turbofan engines. The airline took options on an additional 20 planes. Fokker introduced the airplane, which seats between 100 and 105, earlier this year.

Swissair ordered eight of the planes last year, and KLM Royal Dutch Airlines ordered 10 with options for five more. First deliveries to USAir should occur by the second half of 1988.

"It was a matters of having the right airplane available at the right time at the right price," said David K. Shipley, assistant vice president for public affairs with USAir. "Boeing was obviously a very strong contender with its 737, and we also looked at the (British Aerospace) BAe 146 and at Airbus.

"Fokker came forth with the Fokker 100. They agreed to make substantial changes to meet our requirements. It went right down to the last hour before we made our decision."

Mr. Shipley said USAir had made known to US manufacturers its desire for 100-seat jet to operate efficiently on the shorter spoke segments of the regional "hub and spoke" systems set up by many airlines in the wake of deregulation. Under the plan, airplanes save money and increase efficiency by utilizing many short flights to feed passengers into a central hub terminal where they switch planes and continue on to their destinations.

But the American manufacturers were slow to respond. So USAir, which currently owns 135 airplanes and has 23 138-seat Boeing 737s on order, opted to buy foreign

"We felt Fokker has a solid worldwide support system in place and an excellent reputation for servicing the products they provide," Mr. Shipley explained.

Market Breakthroughs

Fokker officials believe the sale will make future North American orders easier to obtain. It also provides a customer base in North American that justifies an expansion of the customer support organization.

"Because of USAir's stature in the industry, other airlines may follow with orders for our airplanes," said Robert W. Hawk, public relations director for Fokker Aircraft, Inc., in Alexandria, Va.

More importantly, the order justifies Fokker's major gamble in November 1983 to invest $300 million into launching two improved derivative airplanes, the F-100 and the 50-passenger F-50. The alternative for the company was to limit its role to that of a civilian parts subcontractor and supplier.

The USAir order has provided Fokker with substantial breathing room. It will keep the F-100 assembly line busy for 18 months. The F-100 production rate is scheduled to increase to 36 per year by the end of 1985. Officials say the production rate could increase in 1986.

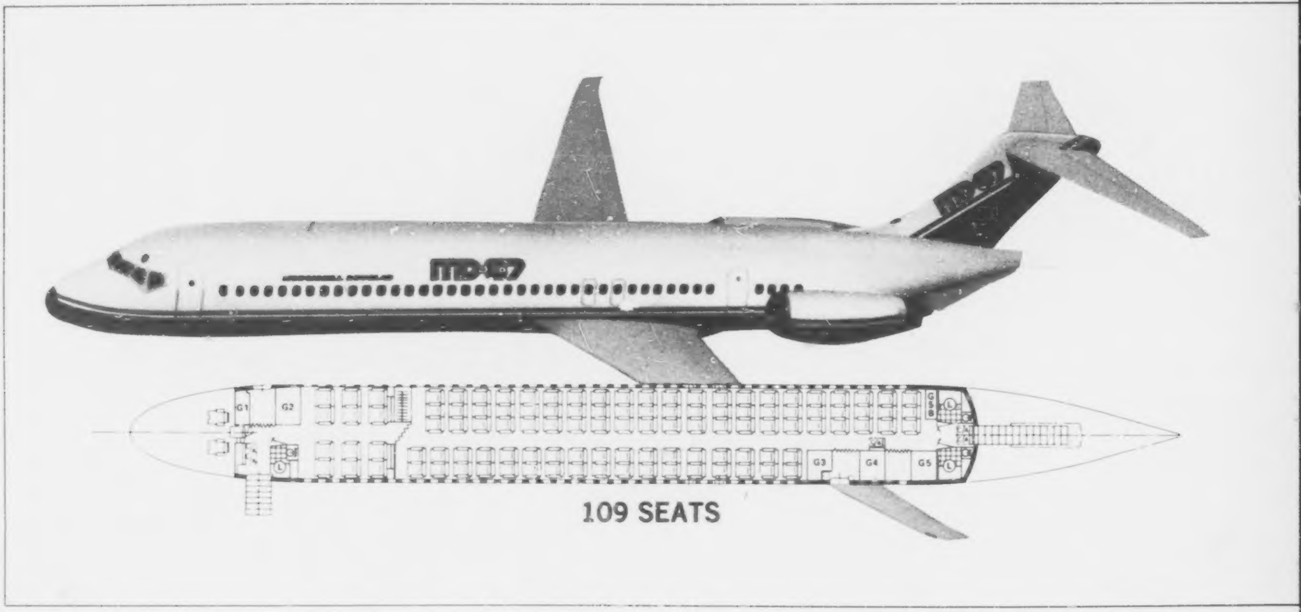
Fokker is scheduled to begin assembly of its first F-100 fuselage later this month.

The F-100, which is also being evaluated by Japanese and other European airlines, is a new technology replacement for the F-28 turboprop.

A second new airplane, the 50-seat Fokker, replaces the F-27. The plane is scheduled to make its first flight in November, and the company has received firm orders for 32 airplanes.

In all, Fokker has sold 100 airplanes this year, compared to 40 in 1984. These include five F-28s to Piedmont Airlines that will be delivered next year. Two additional F-28s were sold to Empire Air, a regional airline that is being acquired by Piedmont.

(Cont on p. 59.)



Douglas has moved ahead with its derivative MD-87 twinjet, a shrunken version of the highly popular MD-80 airplane.

Empire carries about 1.2 million passengers annually with a fleet of 13 twin-engine Fokker 28s. (Four more are on order.) Piedmont has 20 of the planes. (For comparison, the airline has 63 Boeing 737s in its fleet, 34 727s, and another 45 737s on order.)

Company officials say the F-28s will be used to service short haul routes, including a route expansion into several small Florida cities.

"It's ideally designed to fly frequent, intrastate service on short to intermediate range routes," said Don McGuire, vice president for public affairs for Piedmont.

Another incentive for Piedmont was financial. Fokker had taken several F-28s as trade-in aircraft and the manufacturer was willing to totally renovate and warranty the craft. Piedmont was able to grab its 20 planes for $62 million, less than one-third of the price of other, new 100-seat aircraft.

Third World Spinoff

Fokker isn't the only small European company moving aggressively to outmuscle American manufacturers. British Aerospace has been successfully marketing three versions of its BAe 146 aircraft, which was originally designed for Third World markets.

The company currently has 61 firm orders for the BAe 146, including 39 in the North American market. Like Fokker, many of those orders came at the expense of the Douglas MD-80 and the Boeing 737.

"We've had very good sales in major countries," said Douglas W. Nelms, press office manager for British Aerospace, Inc., in Washington. "We didn't expect it to be that popular. It was designed to be a very rugged, simple airplane to fly in less developed countries. But it was the right thing at the right time for the U.S. market."

American customers include regional airlines like Aspen Air, Hawaii Air and Air Wisconsin. These companies join an eclectic international roster including Air Mali in Africa, CAAC in the People's Republic of China and the British Royal Air Force.

Like Fokker, British Aerospace began to be taken seriously as a competitor to the U.S. airplane manufacturers when it scored a major sales coup with a respected U.S. airline. This time, the customer was PSA, a western U.S. carrier that ordered 20 BAe 146s in 1983. Thirteen of the airplanes have been delivered.

"We have been downsizing our fleet," explained William E. Hastings, director of public relations for San Diego, Calif.-based Pacific Southwest Airlines. "The BAe 146 met our needs. It has a low trip cost... and it is so quiet we can fly into the same kind of airport fields as a general aviation airplane."

PSA has used the BAe 146 to replace some older Boeing 727 jets and to service frequent commuter flights into smaller regional airports where stringent community noise standards exist.

"We had no interest in the BAe 146 originally," Mr. Hastings recalled. "But we saw it at the Paris Air Show and were impressed with its performance and efficiency. I don't think the British were even considering pitching it to the highly competitive market here. But it is going to prove to be a very cost efficient airplane."

U.S. Manufacturers Respond

Such sentiments don't appear to publicly rankle officials at Boeing and Douglas. But the inroads made by Fokker and British Aerospace appear to have caused enough chagrin to convince the U.S. manufacturers to address the 100-seat marketplace, even as they near multibillion dollar decisions concerning a new-technology 150-seat airliner for the 1990s and concentrate on marketing relatively new planes like Boeing's 757 and the Douglas MD-80.

Richard Schleh, a Boeing spokesman, says the company is actively talking to a number of airlines about marketing a smaller 100- to 120-seat version of the Boeing 737.

"Some interest in that size airplane has been expressed by a number of airlines," said Mr. Schleh. "But we have not launched the program yet. We want to be sure that if a sufficient market develops, we are represented.

"We've really looked at the market and determined we want to make an offering. We are now going around and saying: 'Are you interested?' "

Unofficially, industry officials are dubbing the derivative 737 the 737 short body or the 737-lite.

But an official launch is far from certain because some officials believe the recent inroads made by British Aerospace and Fokker have dried up immediate demand.

Douglas, however, is moving more aggressively into the marketing fray. The company actually had plans several years ago to make a 110-seat MD 90 all-new aircraft, but the program was dropped in March 1984.

Instead, Douglas has moved ahead with its derivative (and cheaper) MD-87 twinjet, a shrunken version of the highly popular MD-80 airplane. The airplane's fuselage 17.5 ft shorter that the MD-80.

The MD-87 was launched in January 1985 after detailed market studies convinced officials there was worldwide demand for the plane.

Firm orders include eight from Finnair, four from Austrian Airlines and four from TDA Domestic Airlines of Japan.

Elayne Bendell, a Douglas spokeswoman, said the plane has a range of 3,000 miles with supplemental fuel tanks. It is also being offered as a specialty executive jet with a seating capacity of 20.

Douglas officials believe there is a global market for 1,200 such airplanes between 1985 and 1999.

The company also is moving toward development of a new technology 100-seat airplane initially dubbed the MD-91X that would utilize rear-mounted propfan engine technology. It would replace the MD-87 and the smaller 727s and 737s currently in service.

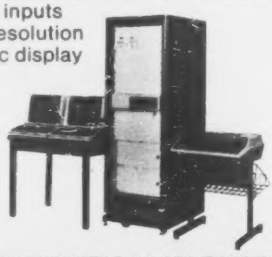
"The major incentive for development is that it would save fuel costs of an estimated 50 pct over a DC-9 of comparable size," Ms. Bendell explained.

No launch date has been set, but deliveries probably wouldn't begin until at least 1991. ☐

SYSTEM 1000
Advanced Data
Acquisition System

If you are considering designing your own data acquisition system by combining various pieces of hardware and software, take a look at Cyber's **SYSTEM 1000** first, maybe we have already done it for you.

- Fully integrated, ready to operate
- Up to 1024 input channels
- Scan rates of up to 20,000 samples-per-second
- MicroPDP-11 based
- Includes a complete software package
- Automatic balance and calibration for bridge inputs
- High resolution graphic display



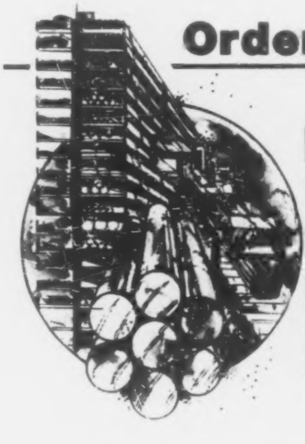
SYSTEMATICALLY SUPERIOR

CYBER SYSTEMS, INC.

2570 E. Cerritos Ave. • Anaheim, CA 92806
(714) 634-2800 • (714) 772-2051 • Telex 692-375

MicroPDP-11 is a trademark of Digital Equipment Corporation

Order Processor



NO MATTER WHAT YOU DO WITH BAR, PIPE OR TUBE, WE CAN SAVE YOU MONEY.

We design and build time-saving, problem-solving machines and systems that make picking, weighing, bundling and shipping steel bar very efficient. We're in business to reduce handling costs and manhours. In fact, Dexco systems are designed to convert entire operations into streamlined, efficient processes.

Dexco Order Processor and Mini-Processors have the features and options to exactly fit your needs.

For free brochure contact:

dexco
Bar Storage & Handling Specialists

P.O. Box 346
Leola, PA 17540
(717) 656-2616

PRICE & PRODUCTION DATA

(Effective October 21,1985)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	172	176	169	123
Pittsburgh	163	161	154	198
Youngstown	97	90	97	95
Lake Erie	148	139	143	137
Detroit	148	149	144	139
Chicago	457	488	476	351
Cincinnati	78	78	93	86
St. Louis	74	75	68	75
Southern	200	194	181	166
Western	86	86	69	77
U.S. Production	1,623	1,636	1,594	1,447

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium

Pellets (per iron unit natural	gross-ton 59.4*
Pellets (per iron unit naturai	gross-ton 72.5-86.9**
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53***

*59.4¢—Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports.
**72.5¢—U.S. Steel as of 8/16/85. **86.9¢—Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs, 2/26/82. ***Effective 8/1/83.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective October 21,1985)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,623	1,636	70,583	75,497
Capability Utilization Rate	63.8	64.3	65.9	69.7

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	27.582
Pig Iron** (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	$ 71.50	$ 71.50	$ 72.17	$ 83.17
No. 2 bundles	$ 52.50	$ 52.50	$ 53.17	$ 50.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 73.50	$ 73.50	$ 75.50	$ 88.50
No. 1 steel, Philadelphia	68.50	68.50	69.50	79.50
No. 1 steel, Chicago	72.50	72.50	72.50	81.50
No. 1 bundles, Detroit	66.50	66.50	69.50	75.50
Low Phos., Youngstown	69.50	69.50	70.50	78.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	69.50
No. 1 mach'y cast., Phila	91.50	91.50	92.50	98.50
No. 1 mach'y cast., Chi	99.50	99.50	99.50	113.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective October 21,1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	43.86	45.01	10/21/85
Copper (C)	66.00-67.00	65.00-67.00	10/21/85
Lead	18.25-19.00	19.00	10/18/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	189.90	197.61	10/21/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00	41.00	9/24/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00-1.25
Calcium, ton lots, crown	$3.76
Chromium, 99.8%	$3.75
Cobalt, 99%, cathode	$12.50
Gold per troy oz.	$326.40
Indium, dollars per troy oz.	$2.50
Iridium, dollars per troy oz.	$440.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb. f.o.b. N.Y.	$320.00-330.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$6.85
Nickel electro (PDCR)	$3.29
Palladium, per troy oz.	$101.00
Platinum, per troy oz.	$320.00
Rhodium, per troy oz.	$1,020.00
Silver ingots, per troy oz.	$6.13
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Oct. 14—552.65
Oct. 15—552.97
Oct. 16—553.95
Oct. 17—557.49
Oct. 18—553.33

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	59	50½
Yellow brass	52⅛	42½
Red brass	55⅜	45
Comm. bronze	56½	45¾
Mang. bronze	44	43
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	56
No. 2 copper wire	47
Light copper	38

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	52
No. 2 copper wire	43
Light copper	34
No. 1 composition	46
No. 1 comp. turnings	44
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	30
Radiators	35

Aluminum

New mixed clips	33	— 34
Old sheet	30	— 31
Old cast	30	— 31
Clean dry borings	31	— 32

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	24	— 26
Mixed L.C. clips	21	— 22
Old sheets and cast	20	— 21
Borings and turnings	16	— 18
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 39
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	115	—125
Nickel rod ends	115	—125
Nickel sheets, clips	115	—125
Nickel turnings	25	— 35

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

NOTICE: Cleveland and Youngstown scrap price reporting change

Iron Age will change its method of reporting scrap prices in **Cleveland** and **Youngstown** from consumer delivered prices to broker buying prices beginning the effective date of Nov.11. Those prices will appear in the Dec.6 issue.

Much of the scrap in Cleveland and Youngstown is shipped to consumers in other cities. Broker buying prices more accurately reflect the variety of markets for Cleveland and Youngstown scrap. Also on Nov. 11 *Iron Age* will reduce the range in prices for Cleveland and Youngstown from $3 to $1. In addition, *Iron Age* will no longer list the Cleveland prices of mixed borings and turnings, drop forge flashings, steel axle turnings, railroad cast, cupola cast and stove plate, since the volume of business in these grades is minimal. *Iron Age* will begin listing Cleveland prices for (1) mixed cast and (2) plate and structural steel, five ft and under.

In August and September, *Iron Age* raised the prices of many grades of Cleveland and Youngstown scrap to align them more closely with consumer delivered prices. For some of these grades, the actual market prices did not rise as much as the *Iron Age* prices did. *Iron Age* welcomes written comments regarding these changes. Write to Michael Marley, Managing Editor, Iron Age, Chilton Co., Chilton Way, Radnor, Pa. 19089.

EFFECTIVE OCTOBER 21, 1985

(Effective October 21,1985) Prices obtained in trade based on rep- tative tonnages per gross ton delivered to consumer unless wise stated. Prices are the opinions of *Iron Age* editors and spondents, based on contacts with dealers, brokers, genera- and users in the industry on the effective date listed above.

errous Scrap Prices

ittsburgh

1 hvy. melting	$ 73.00 to	$ 74.00
2 hvy. melting	63.00 to	64.00
. 1 dealer bundles	88.00 to	89.00
1 factory bundles (auto)	88.00 to	89.00
No. 2 bundles	54.00 to	55.00
No. 1 busheling	85.00 to	86.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	38.00 to	39.00
Low phos. punchings plate	90.00 to	91.00
Heavy turnings	63.00 to	64.00
No. 1 RR hvy. melting	80.00 to	81.00
Rails, 2 ft. and under	96.00 to	97.00
Scrap rails, random lgth	80.00 to	81.00
RR specialties	92.00 to	93.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	64.00 to	65.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	530.00 to	540.00
18-8 turnings	430.00 to	440.00

Chicago

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	65.00 to	66.00
No. 1 dealer bundles	86.00 to	87.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	59.00 to	60.00
No. 1 busheling	83.00 to	84.00
Shredder scrap	82.00 to	83.00
Machine shop turnings	41.00 to	42.00
Mixed borings and turnings	43.00 to	44.00
Shoveling turnings	45.00 to	46.00
Cast iron borings	45.00 to	46.00
Low phos. forge crop	95.00 to	96.00
Low phos. punchings plate		
1/4 in. and heavier	111.00 to	112.00
Low phos. 2 ft. and under	106.00 to	107.00
No. 1 RR hvy. melting	76.00 to	77.00
Scrap rails random lgth	82.00 to	83.00
Reroller rails	107.00 to	108.00
Rails, 2 ft. and under	105.00 to	106.00
RR couplers and knuckles	90.00 to	91.00
RR car axles	111.00 to	112.00
No. 1 machinery cast	99.00 to	100.00
Cupola cast	87.00 to	88.00
Stove plate	89.00 to	90.00
Steel car wheels	89.00 to	90.00
Stainless		
18-8 bundles and solids	530.00 to	540.00
18-8 turnings	445.00 to	455.00
430 bundles and solids	140.00 to	145.00
430 turnings	110.00 to	115.00

Philadelphia

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	58.00 to	61.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	42.00 to	45.00
No. 1 busheling	80.00 to	83.00
Shredder scrap	82.00 to	85.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	76.00 to	79.00
Low phos. 2 ft. punchings	97.00 to	100.00
Electric furnace bundles	87.00 to	90.00
RR specialties	76.00 to	79.00
Rails, 2 ft. and under	100.00 to	103.00
Cupola cast	76.00 to	79.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	90.00 to	93.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	51.00 to	52.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	29.00 to	30.00
No. 1 busheling	65.00 to	66.00
Drop forge flashings	41.00 to	42.00
Machine shop turnings	40.00 to	41.00
Mixed borings and turnings	19.00 to	20.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	23.00 to	24.00
Heavy breakable cast	34.00 to	35.00
Mixed cupola cast	49.00 to	50.00
Automobile cast	73.00 to	74.00
Stainless		
18-8 bundles and solids	500.00 to	510.00
18-8 turnings	380.00 to	390.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	56.00 to	59.00
No. 1 dealer bundles	73.00 to	76.00
No. 2 dealer bundles	31.00 to	34.00
Machine shop turnings	24.00 to	27.00
Shoveling turnings	24.00 to	27.00
Low phos. plate	68.00 to	71.00
Electric furnace bundles	72.00 to	75.00
Galvanized bundles	64.00 to	67.00

Cleveland

No. 1 hvy. melting	$ 55.00 to	$ 58.00
No. 2 hvy. melting	46.00 to	49.00
No. 1 dealer bundles	77.00 to	80.00
No. 1 factory bundles	68.00 to	71.00
No. 2 bundles	29.00 to	32.00
No. 1 busheling	75.00 to	78.00
Machine shop turnings	16.00 to	19.00
Mixed borings and turnings	7.00 to	10.00
Shoveling turnings	24.00 to	27.00
Cast iron borings	17.00 to	20.00
Cut structural & plates,		
2 ft. and under	97.00 to	100.00
Low phos. punchings plate	97.00 to	100.00
Drop forge flashings	48.00 to	51.00
Foundry steel, 2 ft. & under	69.00 to	72.00
No. 1 RR hvy. melting	63.00 to	66.00
Rails, 2 ft. and under	90.00 to	93.00
Rails, 18 in. and under	94.00 to	97.00
Steel axle turnings	57.00 to	60.00
Railroad cast	89.00 to	92.00
No. 1 machinery cast	88.00 to	91.00
Cupola cast	55.00 to	58.00
Stove plate	54.00 to	57.00
Stainless		
18-8 bundles	485.00 to	495.00
18-8 turnings	365.00 to	375.00
430 bundles	90.00 to	100.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	43.00 to	44.00
No. 1 busheling	67.00 to	68.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	30.00 to	31.00
Machine shop turnings	16.00 to	17.00
Mixed boring and turnings	16.00 to	17.00
Shoveling turnings	22.00 to	23.00
Cast iron borings	24.00 to	25.00
Low phos. plate	75.00 to	76.00
Structural and plate,		
2 ft. and under	79.00 to	80.00
Rails, 2 ft. and under	79.00 to	80.00
Scrap rails, random lgth	64.00 to	65.00
No. 1 machinery cast	77.00 to	78.00
No. 1 cupola cast	59.00 to	60.00

St. Louis

No. 1 hvy. melting	$ 45.00 to	$ 46.00
No. 2 hvy. melting	34.00 to	35.00
Foundry steel, 2 ft.	39.00 to	40.00
No. 1 dealer bundles	45.00 to	46.00
No. 2 bundles	30.00 to	31.00
Machine shop turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	53.00 to	54.00
Rails, random length	59.00 to	60.00
Rails, 18 in. and under	72.00 to	73.00
RR specialties	70.00 to	71.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	89.00 to	90.00
Steel car wheels	81.00 to	82.00
Rerolling rails	69.00 to	70.00
Unstripped motor blocks	64.00 to	65.00

Birmingham

No. 1 hvy. melting	$ 73.00 to	$ 74.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	73.00 to	74.00
No. 2 bundles	48.00 to	49.00
No. 1 busheling	73.00 to	74.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	25.00 to	26.00
Shoveling turnings	39.00 to	40.00
Cast iron borings	38.00 to	39.00
Electric furnace bundles	66.00 to	67.00
Elec. furnace, 3 ft. & under	69.00 to	70.00
Structural and plate, 2 ft.	90.00 to	91.00
Structural and plate, 4 ft.	85.00 to	86.00
No. 1 RR hvy. melting	85.00 to	86.00
Scrap rails, random lgth	77.00 to	78.00
Rails, 2 ft. and under	90.00 to	91.00
Angles and splice bars	84.00 to	85.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	74.00 to	75.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	15.00 to	16.00
Low phos. 18 in. and under	79.00 to	80.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	74.00 to	75.00
No. 1 cupola cast	59.00 to	60.00
Heavy breakable cast	24.00 to	25.00
Drop broken cast	71.00 to	72.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	490.00 to	500.00
18-8 turnings	390.00 to	400.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	17.00 to	19.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	13.00 to	14.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under		
(foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 82.00
No. 2 hvy. melting, cut 2 ft. and under	72.00
No. 1 dealer bundles	83.00
No. 2 bundles	58.00
Mixed steel scrap	53.00
Bush. new fact. prep'd	83.00
Bush. new fact. unprp'd	64.00
Machine shop turnings	35.00
Short steel turnings	35.00
Mixed borings and turnings	20.00
Cast scrap	89.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	54.00 to	55.00
No. 2 bundles	40.00 to	41.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	30.00 to	31.00
Shredder scrap	74.00 to	75.00
Cut structural plate, 2 ft. and under	97.00 to	98.00
Cut structural plate, 5 ft. and under	79.00 to	80.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	83.00 to	84.00

AUTOS LEAD IN NEW WAVE OF PRICE CUTS

September was a ho-hum month for prices; they were down—again.

Producers' prices for finished goods fell 0.6 pct from August.

To nobody's suprise, the price story for September was centered in the auto industry. As noted on the table here, prices of autos fell by 8.1 pct from August. Further, tags on both light and heavy trucks also showed big slashes.

Here's the U.S. Labor Dept's. explanation for the sharp price slide in total finished goods in September: "Sharply lower prices for motor vehicles, largely reflecting efforts by domestic manufacturers to liquidate inventories of 1985 models by offering customers liberalized financing terms, were responsible for most of the September decline in the Finished Goods Price Index."

The September price slide was not in autos alone. As noted on the table, nine of the 22 metalworking product categories registered price declines during the month.

Further evidence of the continuing softness in producer prices was seen in cuts made in all stages of goods processing. Prices of intermediate goods were unchanged in September after falling for three straight months. And prices of crude materials were down 0.3 pct—the ninth straight month of lower tags.

An example of crude materials is iron and steel scrap. An example of intermediate goods is the sheet metal produced from the scrap. And examples of finished goods are the autos that consume much of the sheet metal.

Tags on capital equipment offer another sign of the pervasive and extensive softness in prices. In September, prices for capital goods as measured by the producer goods index were the same, almost to the dollar, as they were far back in the first month of the year.

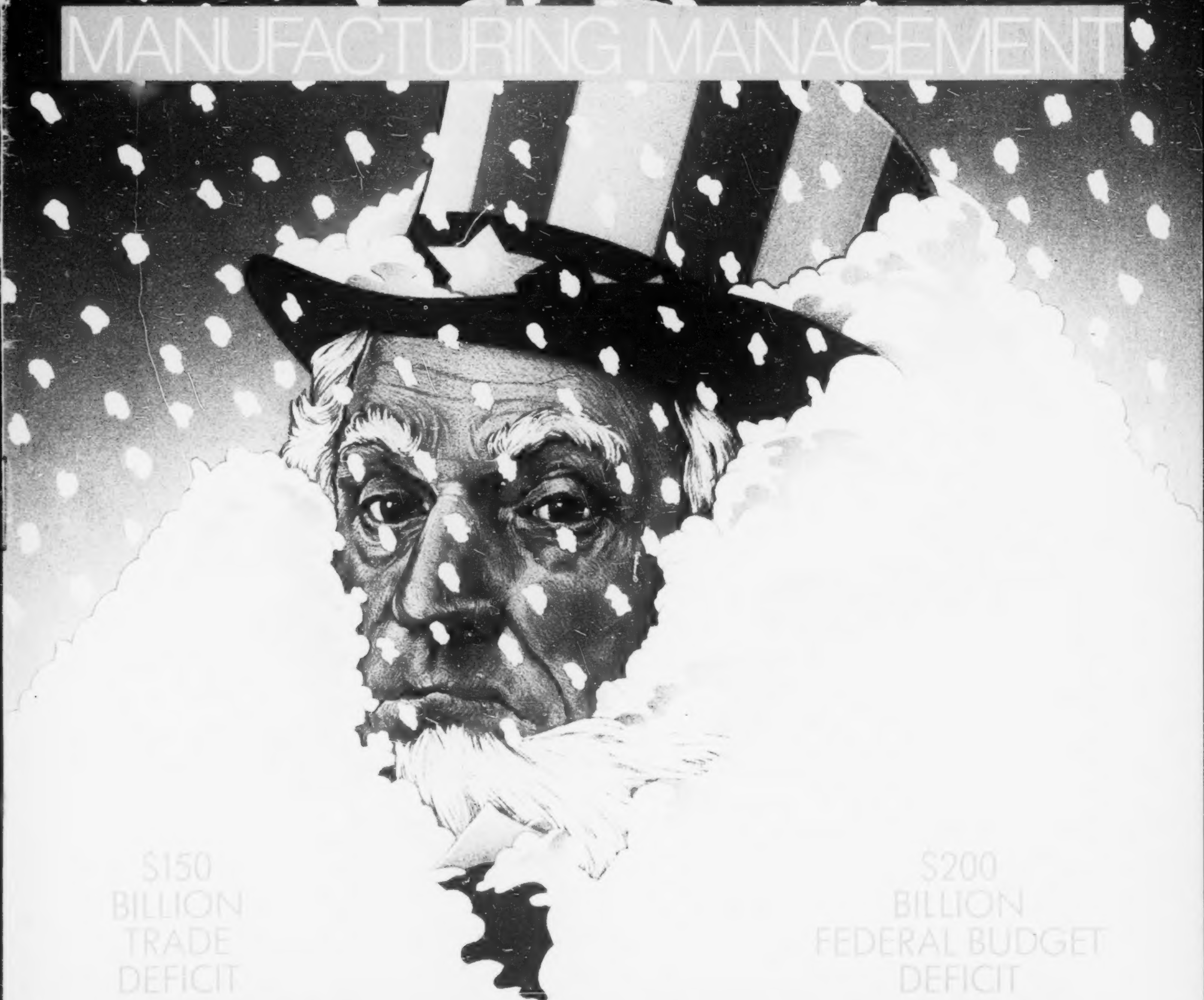
Latest Month Covered: September 1985

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	398.1	+ 0.3	+ 2.9
Metal Forming Machine Tools	434.8	0	+ 2.2
Agricultural Machinery & Equip.	337.4	— 0.3	+ 0.1
Construction Machinery & Equip.	362.8	+ 0.1	+ 1.6
Industrial Process Furnace & Ovens	385.5	0	+ 2.3
Industrial Material Handling Equip.	295.1	— 0.2	+ 1.6
Pumps, Compressors & Allied Equip.	357.4	+ 0.1	+ 2.2
Fluid Power Equip. (Dec. 1970 = 100)	265.0	0	+ 1.4
Mechanical Power Transmission Equip.	339.8	— 0.1	+ 2.9
Automobiles	209.5	— 8.1	— 1.3
Motor Trucks—Light	272.9	— 7.1	+ 1.7
Motor Trucks—Heavy	316.7	— 5.0	— 3.4
Railroad Equipment	364.6	0	+ 2.0
Fabricated Metal Structural Products	315.1	0	+ 1.0
Electric Motors	351.6	+ 0.1	— 3.4
Valves & Fittings (Dec. 1982 = 100)	105.1	+ 0.2	+ 2.3
Ball & Roller Bearings	353.5	— 0.2	+ 2.7
Cutting Tools & Accessories	286.7	0	+ 2.4
Heating Equipment	261.5	+ 0.2	+ 2.3
Plumbing Fixtures & Brass Fittings	313.6	0	+ 3.0
Metal Containers	357.7	— 0.1	+ 1.5
Miscellaneous Metal Products	302.5	— 0.2	+ 2.3

Data based on U.S. Labor Dept.'s Producer Price Index

CHILTON'S
December 6, 1985

IRON AGE
MANUFACTURING MANAGEMENT


$150
BILLION
TRADE
DEFICIT
$200
BILLION
FEDERAL BUDGET
DEFICIT

U.S. TRADE: WHAT NOW?

SUPERALLOYS SOAR TO NEW HORIZONS

COMPOSITES FABRICATION

DECEMBER 6, 1985 VOL. 228, NO. 23

CHILTON'S
IRONAGE
MANUFACTURING MANAGEMENT

Editorial 7
Are we selling off the farm?

Newswatch 15
Future Fords: Alpha and then the T-2008.

Machine Tool Report 23
Combining a transfer line with a machining center.

Trade 27
The bottom line should be free, but fair, trade.

Superalloys 37
They're not only for jet engines.

Composites 45
What processes will be fabricating tomorrow's composites?

Materials Report 61
The new E.E.C.-U.S. steel trade pact displeases American steelmakers.

Order Trends 68
It's been a yo-yo year for orders.

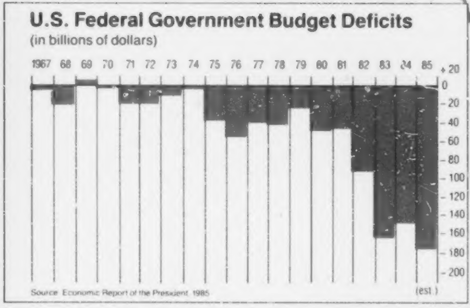
Next Issue: Advanced Metal Cutting Technology.

Departments

EDITORIAL STAFF **8**
LETTERS **8**
PRODUCT REVIEW **54**
AD INDEX **58**
BUSINESS STAFF **58**
MANAGEMENT SERVICE CARD **59**
P&P DATA 11/11 **62**
FERROUS SCRAP 11/11 **63**
STEEL PRICES **64**
CLEARING HOUSE **66**

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$42 one year, $69 Canada/Foreign (24 issues); Metalsproducer U.S. edition—$24 one year (12 issues); $27 one year (6 issues). Single copies, $2.50. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077.

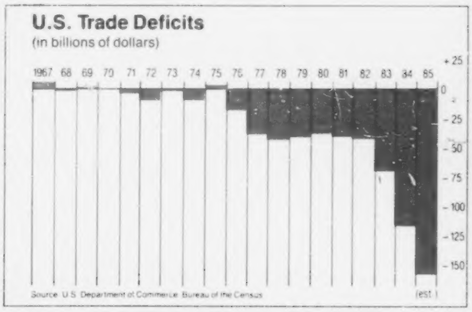
Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES



U.S. Federal Government Budget Deficits

(in billions of dollars)

Source: Economic Report of the President, 1985



U.S. Trade Deficits

(in billions of dollars)

Source: U.S. Department of Commerce, Bureau of the Census

BY BRYAN H. BERRY

U.S. TRADE: WHAT NOW?

What is going on here? Consider these puzzlers:

—Japan is vital to world peace and the national security of the U.S., so President Reagan soft-pedals his efforts to get it to open its markets. Meanwhile, American steel, machine tool, and semiconductor makers demand protection from Japanese imports, since they're vital to American national security.

—Congress proposes 200-odd bills to protect American industries but lacks the discipline to take the single action that would do the most to reduce the trade deficit: cut government spending.

—U.S. banks lend billions of dollars to Latin American nations, which then find themselves hard-pressed even to pay interest on the loans. To win surplus dollars, the nations cut imports and increase exports to the U.S. The U.S. then threatens to reduce Latin American imports, which would deny these nations the means to repay their debts to U.S. banks.

—From 1981 to 1984, the U.S. trade deficit with every one of its four major trading partners—Canada, Japan, Europe, and Latin America—grows by $15-20 billion. Yet Japan becomes the whipping boy for all of America's industrial woes, since it's responsible for the biggest trade imbalance: $37 billion in 1984, an estimated $50 billion this year.

But Japan is a story in itself. Grasping for reasons to explain Japan's success, American manufacturers have swallowed some big lies about the Asian island. Consider these myths:

—From 1980 to 1985, the U.S. dollar rose by 65 pct against the Deutschemark, 70 pct against the British pound, 115 pct against the French franc—and 9 pct against the Japanese yen. Yet received wisdom in America's industrial heartland is that Japan was artificially manipulating the yen to push it down against the dollar and boost exports to the U.S. In recent years Japanese businessmen and government officials repeatedly have explained to Americans that no, they weren't holding down the yen, that instead the dollar was too strong. And according to all the evidence gathered by the U.S. government, the Japanese explanation is correct.

—Japan, Inc., orchestrated by Japan's Ministry of International Trade and Industry (MITI), is the deep dark secretive machine orchestrating Japan's industrial successes, Americans have told one another over the years. But the fact is: Japanese companies are fiercely competitive against one another, and MITI has sponsored as many failures as successes. Most notable mistake: MITI ordered the consolidation of the Japanese auto industry into two or three major companies, as in the U.S. But Honda, Mazda, and Mitsubishi disagreed, and now each of them is healthy enough to be building an auto plant in the U.S.

—The U.S. has become a second-rate colony to proud Japan, charge some Americans: We ship them corn, and they ship us Toyotas. But in fact fully half of U.S. exports to Japan are manufactured goods. Of the $23.6 billion in goods we shipped Japan last year, $11.9 billion were aircraft, electronics, data-processing equipment, and other manufactured goods. To be sure, we also shipped $11.7 billion in raw materials, including $1.9 billion of corn, $0.9 billion of coal, and $0.6 billion of cotton. And fully 98 pct of our imports from Japan were manufactured goods. But we shipped more manufactured goods to Japan than, for example, Germany.

What's ironic is that the top ten nations swamping us with imports also happen to be among our most important allies (see table, p.). The nations of Latin America owe much of their political stability to their ability to export their way out of the debt crisis. Japan is our most strategic military ally. Thundering about trade wars and vengeance, Americans sometimes forget that these are our friends we're talking about, not our enemies.

Oil and Autos

Oil accounted for most of the trade deficits in the 1970s. It's still the largest single item in the deficit, accounting for fully $55 billion of last year's $123 billion trade imbalance.

The two oil shocks of 1973-74 and 1979 hiked oil prices and greatly increased consumers' desires for small cars. Preoccupied with meeting new government rules on fuel economy, emissions, and the environment, Detroit offered Vegas and Pintos to compete against Datsun B-210s and Honda Civics.

Detroit's offerings disappointed American consumers, particularly younger ones, who switched to Japanese brands. Though the quality of American cars now is almost equal with that of the Japanese, Detroit's small cars in the 1970s saddled it with an image of poor quality that it has yet to overcome fully.

Cars accounted for the greatest share of the Japanese imports until 1984, when the $15 billion in televisions, stereos, video-cassette recorders, data-processing equipment, and other electronics equipment surpassed the $13.7 billion of cars shipped here from Japan. Hardest hit by the surge of Japanese electronics imports are the American semiconductor makers, who have petitioned the U.S. government for relief.

Engine of Growth

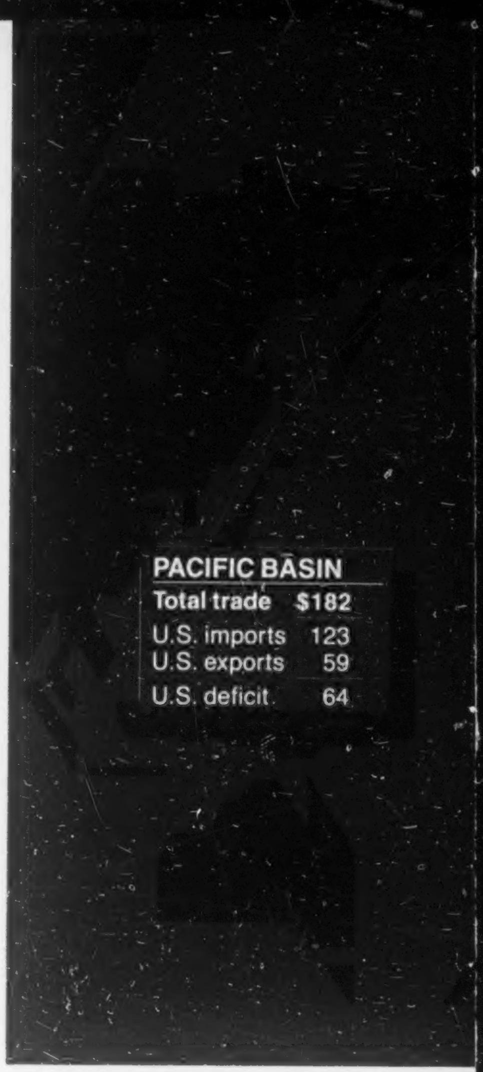
From 1977 to 1982 the U.S. trade deficit hovered around $40 billion, most of it oil. But in 1983 the U.S. economy started growing phenomenally, hitting 8.7 pct growth in the peak year of 1984—its biggest growth since 1951.

The Reagan administration had cut taxes and sweetened incentives for capital spending. The Federal Reserve Board kept the supply of dollars low by making them expensive to buy—by raising interest rates. That kept inflation low. These Federal policies combined to spark the boom in plant modernization, new construction, and consumer spending in 1983-84.

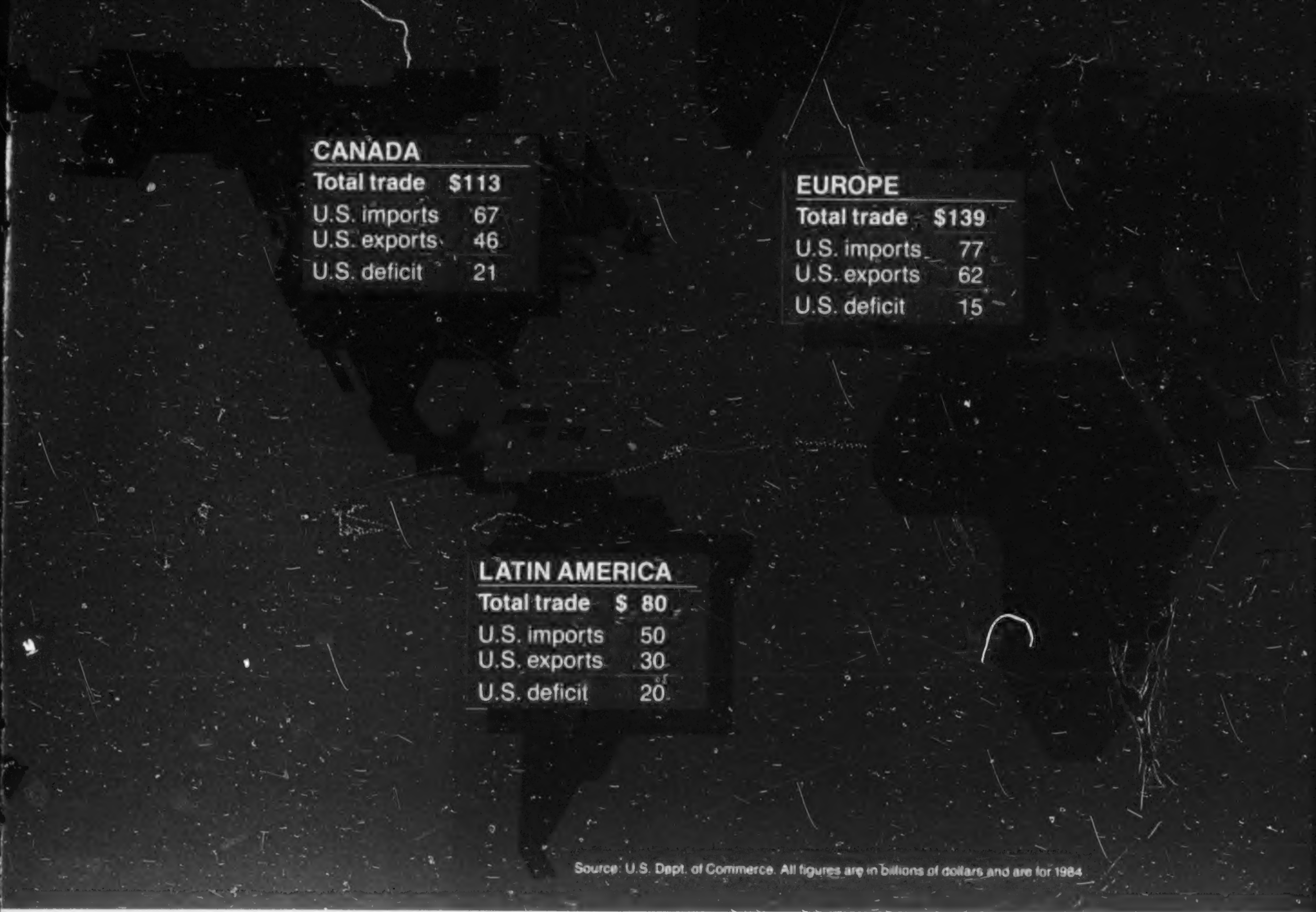
1983 and 1984 were also the first two years in which the U.S. trade deficits took unprecedented leaps to a record $69 billion in 1983 and another record of $123 billion in 1984. As the growth in the U.S. economy slowed this year, so did the growth in the trade deficit, which will hit another record mark—about $150 billion—for 1985.

The American economy was the engine of growth for the world economy in 1983-84. As the U.S. economy revved up to 8.7 pct growth in 1984, Japan's grew by 5 pct and Western Europe's by 3 pct.

In 1984 most of the growth in the economies of Japan, Canada, Latin American, and the newly industrialized countries of the Pacific basin was due to exports. And most of those exports went to the U.S.: fully 80 pct of Japan's additional exports and nearly all of Canada's. Exports to the U.S. accounted for nearly all the growth in the gross national product (GNP) of Canada and Mexico from 1982 to 1984, nearly one-half of Japan's, and one-fourth of the European Community's. Despite the bellicose threats exchanged between nations about trade, these parts of the world can thank Uncle Sam for their recent economic growth.



PACIFIC BASIN	
Total trade	**$182**
U.S. imports	123
U.S. exports	59
U.S. deficit	64



Source: U.S. Dept. of Commerce. All figures are in billions of dollars and are for 1984

And Uncle Sam can thank them. The tide of imports satisfied Americans' demand for goods and kept supply steady enough to control inflation, an unwelcome result of many past booms in consumer demand.

Debts and Deficits

As Americans paid their dollars for Nikon cameras and Volvo station wagons, the foreigners then invested these dollars at the highest interest rates available in the world: right here in the U.S., of course, where U.S. Treasury bills and bonds were and are paying rates twice as high as in Europe and Japan.

This also proved helpful to the U.S., since the U.S. government has been spending billions more than it's been taking in. The total debt accumulated by Uncle Sam over the years will hit the $2 trillion mark in 1986. The Federal budget deficit for 1985 will top $200 billion.

The U.S. government was fortunate to be able to borrow money from foreigners, because American banks don't have enough money to lend. Americans save 5 pct of their disposable income; the Japanese, 17 pct.

"The Reagan tax program increased capital investments," pointed out Geza Feketekuty, senior assistant to U.S. Trade Representative Clayton Yeutter. "The problem is, it didn't increase savings." Savings by individual Americans have remained fairly constant over the past four years—not nearly enough to cover burgeoning Federal deficits.

In fact, savings by American businesses and individuals covered only 70 pct of U.S. capital requirements in 1984. Foreign-owned dollars financed the rest. Japan, for example, is lending almost $60 billion for the U.S. Federal deficit in 1985. In 1984 the U.S. government paid $19 billion in interest to foreigners holding U.S. Federal debt issues.

The flow of foreign capital into the U.S. also helped prevent inflation here. Without the foreign dollars, the U.S. would have had to increase its money supply.

In 1982 the U.S. was the world's largest creditor: Foreigners owed us $150 billion. This year we became a debtor nation for the first time since 1914. Some time next year, estimates the U.S. Dept. of Commerce, the U.S. will owe foreigners $150 billion, making us the world's largest debtor. That's a dizzying $300 billion swing in capital flow in four short years.

The Strong Dollar

The rising value of the dollar since 1980 clearly has been a major cause of the trade deficit. From 1980 until February 1985, the dollar rose steadily against the world's major currencies: by 76 pct against an index of 67 countries, by 39 pct against the 14 major industrial nations.

To be sure, the dollar had been

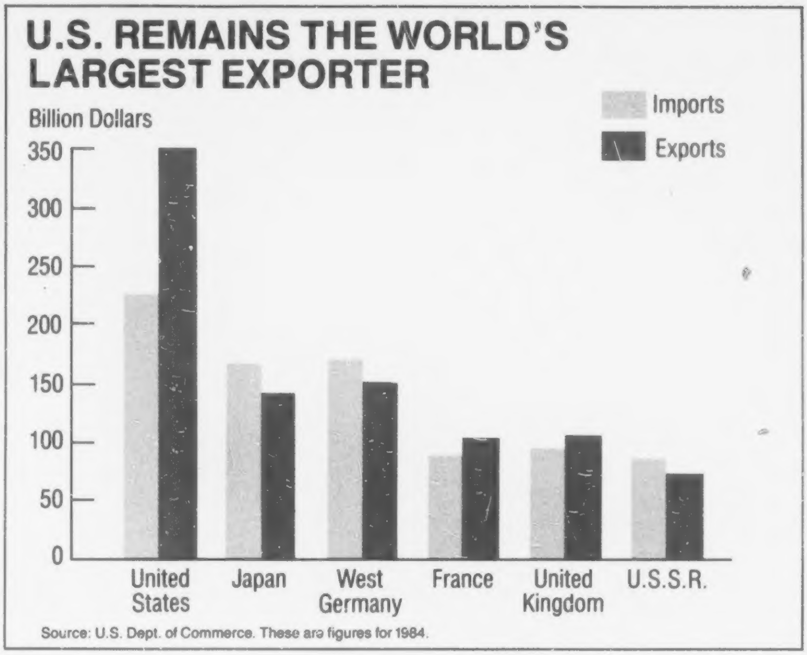
pushed abnormally low in 1980 by the inflation and economic downturn in the later years of the Carter Administration. And though the dollar rose just 9 pct against the Japanese yen from 1980 to early 1985, the yen in 1980 was abnormally low, too. The Japanese government had intervened in the mid-1970s to weaken the yen and strengthen exports. After then, the Japanese government let the market set the yen's value.

Only in 1973 did the major governments of the world allow the free market to set the value of their currencies. From 1945 to 1969, these nations adhered to the Bretton Woods agreement and fixed their exchange rates. After 1969, these controls loosened. The nations formally decided in the Smithsonian agreement to let the market set the rates.

This year, as the growth in the U.S. economy slowed from its torrid pace of 1984, the dollar dropped gradually by 12 pct through September. But as Congress grew more militant in threatening protectionism, the finance ministers of the U.S. and four nations intervened in the exchange rates. To push the dollar down, the treasuries of the Group of Five (G-5: U.S., Japan, Britain, France, West Germany) sold dollars in large volumes. This raised the supply of dollars, cut demand, and lowered the price of dollars. Since the G-5 announced its policy of intervention in late September, the dollar has fallen by 10 pct against the Japanese yen.

This is good news, but it's still unclear how much the new policy of intervention by the G-5 will affect the dollar. The finance ministers have not set—or at least not publicly stated—targets for where they'd like the exchange rates to be. Nor have they said how long or how often they'll intervene.

But the key question remains: What will the open market tell us the price of the dollar should be? The simple, inexorable law of supply and demand will continue to set the dollar's exchange rate, even if the G-5 intervene now and then. And demand for dollars remains high.



U.S. REMAINS THE WORLD'S LARGEST EXPORTER

Source: U.S. Dept. of Commerce. These are figures for 1984.

Not only is the U.S. a haven for investments, but many of the world's goods—notably, oil—must be paid for in dollars all over the world. Japan must pay for 90 pct of its imports, including oil, in dollars.

Most analysts agree that the dollar must drop another 20 pct from its November levels to substantially reduce the U.S. trade deficit. The Japanese government says it wants to raise the yen so that one dollar equals 200 or fewer yen. Last month one dollar equaled about 215 yen. The yen bottomed out in November 1982 at 275 to the dollar.

As the dollar weakens, our trade deficits will go through what economists call a J-curve. That is, foreigners will continue to export the same volume of goods to us. As the value of the dollar falls, we'll have to spend more dollars to buy the same number of imports. In dollars, therefore, our trade deficit will actually get bigger before it gets smaller.

This J-curve takes 18 months to 2 years to make its full sweep. The growth in the trade deficit in 1985 already has slowed from its skyrocketing in 1984—and should continue to slow next year. However, most analysts expect our trade deficits to remain on the $150-billion plateau in 1986 and probably for two or three years beyond.

Business executives often complain that the massive flow of capital into the U.S. skews the way exchange rates are set, unnaturally pumping up the dollar. In the past, they say, the flow of trade determined exchange rates.

But, in fact, not since the death of Bretton Woods in 1973 have trade flows alone determined exchange rates. Since 1973 exchange rates have been set by the simple law of supply and demand. And demand for dollars will remain high as long as the U.S. government pays interest rates that are twice as high as what foreigners can get at home.

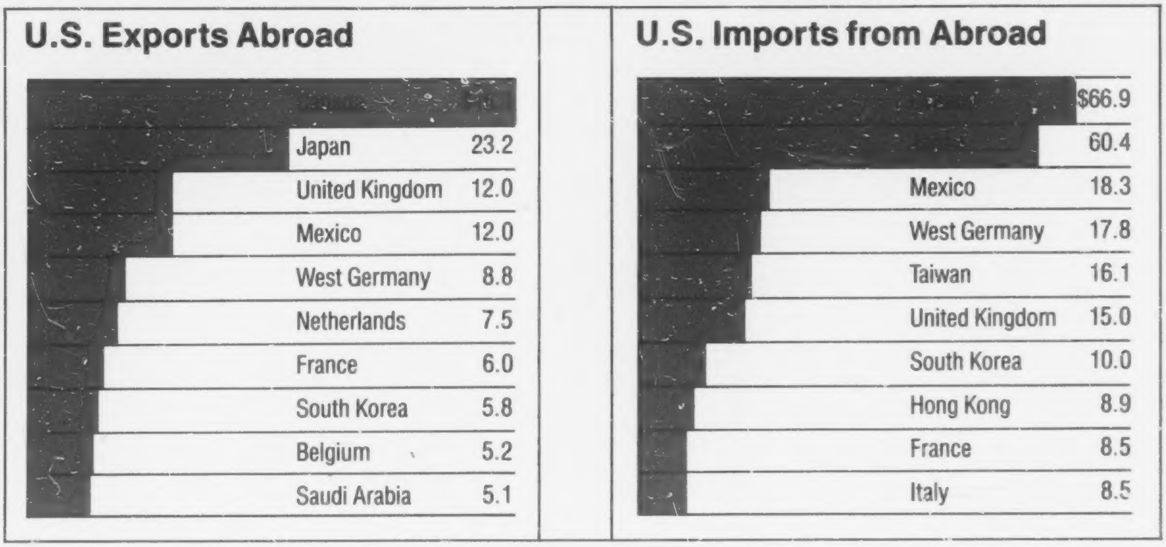
U.S. interest rates will remain high as long as the U.S. government hogs the supply of dollars. By spending $200 billion more each year than it takes in, Uncle Sam is making everyone else pay dearly for the supply of dollars left over. And the supply of dollars available to the American private sector is low, because Federal Reserve Board Chairman Paul Volcker is understandably keen on keeping inflation low.

Cutting the Trade Deficit

So what's the quickest way to reduce the U.S. trade deficit? You said it: Reduce the Federal budget deficit! That's what's skewing exchange rates: The massive flow of capital into the U.S. is an indirect result of the bloated Federal deficits here.

OUR TOP TEN TRADING PARTNERS (in billions of dollars)

Source: U.S. Dept. of Commerce. All figures are for 1984.



"If I were a businessman, I'd be screaming!" said Sidney L. Jones, the U.S. Department of Commerce's undersecretary for economic affairs. "How can the government say there's free trade and a natural market flow when our government policy is to have high budget deficits? Exchange rates won't be normal until interest rates are normal. And interest rates won't be normal until the Federal budget deficit is reduced."

Another way to reduce the trade deficit is for Europe and Japan to take over from us as the engines of growth for the world economy. Japan's economy is growing, but most of that growth so far has come from exports. Europe is stagnant. Latin America is still struggling to pay its international debts and can't be counted on to increase imports from the U.S. until it achieves financial stability.

"It's wishful thinking to say we'll export our way out of our trade problem," said Lawrence A. Fox, the National Association of Manufacturers' (NAM) vice president of international economic affairs.

Indeed, too many American manufacturers appear simply to have given up any attempt to increase exports. Instead of learning to speak Japanese and setting up offices there and in Europe, many Americans have swallowed the big lie that the U.S. can't compete worldwide. Such self-fulfilling prophecies have done more than their fair share to increase our trade deficit.

To be sure, the U.S. is the most open market in the world. Europe limits various imports, including autos from Japan. Japan actually has lower average tariffs than the U.S.—9 pct there, 9.5 pct here—but has hidden behind a shifting camouflage of non-tariff barriers that require some real perseverance by foreigners to overcome.

The NAM was among the American concerns that lobbied hard to get Japan to open the newly privatized Nippon Telephone and Telegraph to foreign competition. NAM's diligence paid off, but too many Americans lack the commitment to sell their goods in Japan. "Some Americans regard the Japanese language as a non-tariff barrier," wryly pointed out Robert E. Watkins, the U.S. Department of Commerce's deputy assistant secretary for automotive affairs and consumer goods.

The commitment of Japanese business and government to sell their products in the U.S. is key to the Japanese success here. Their diligent adherence to a national policy of exporting no doubt will weather a weaker dollar—even it lowers their profits somewhat. Japanese auto exports to the U.S. climbed steeply in the second half of the 1970s even as the dollar hit a low of 175 yen per dollar. And following hard on the heels of the Japanese are Korea, Singapore, Hong Kong, and Taiwan.

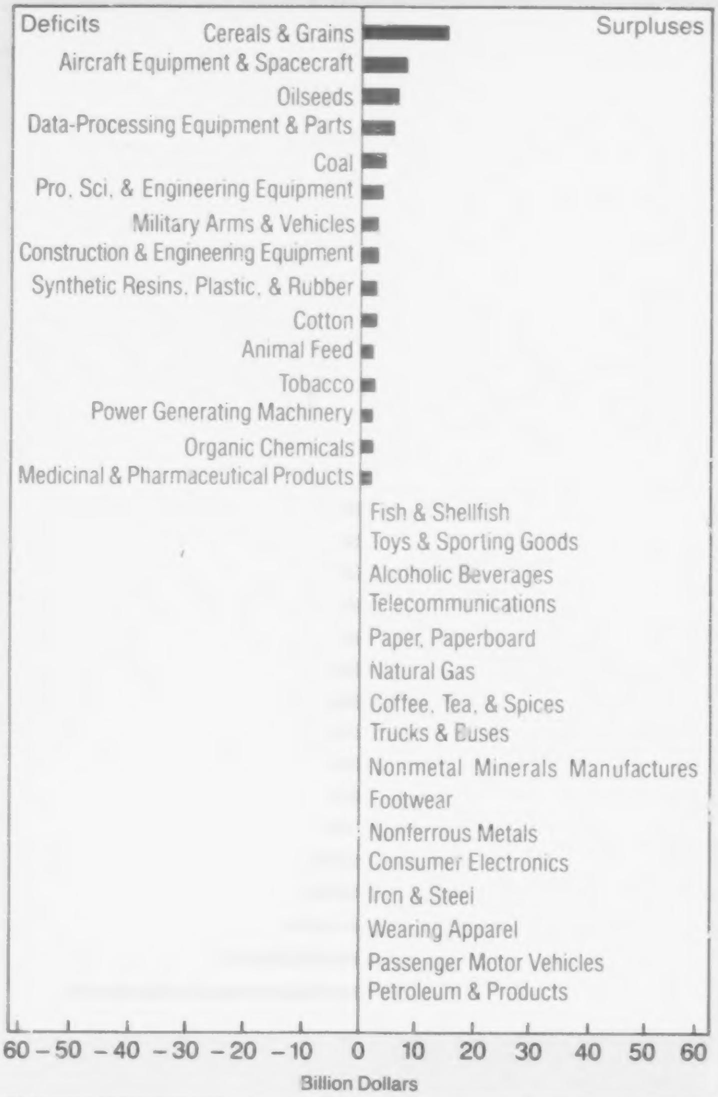
"We're still trying to find the means to grapple with industrial targeting by other nations," said Bruce P. Malashevich, vice president of the Washington, D.C.-based Economic Consulting Services, Inc. "We're the natural target for world trade, since there's no other place as big or as open as the United States. Everybody's efforts are concentrated on us.

"What we're mainly dealing with is the natural inclination of nations to increase their wealth. That's more important than exchange rates or capital flows."

Protectionism

In September President Reagan announced that the U.S. government will oppose unfair trade practices by initiating Section 201 and 301 cases and by making it easier for industry to file these petitions for relief.

Section 201 of the Trade Act of 1974 gives relief to American industries threatened by all imports—and reduces imports from all countries. Section 301 prohibits dumping by specific countries. The Cast Metals Federation is among the trade groups presently collecting data to win protection from imports.



OIL IS STILL NO. 1 IMPORT

U.S. Trade Balances by Products

Source U.S. Dept. of Commerce. All figures are for 1984

Some industries, including makers of specialty and carbon steels, already have won protection. Harley-Davidson, the sole remaining U.S. builder of big motorcycles, won big increases in duties on imports. In addition to the standard 4-pct duty on all imported vehicles, importers of big bikes paid an extra 45 pct duty in 1983-84, 35 pct the next year, and so on down to an extra 10 pct in 1988-89.

The U.S. also has become much more aggressive in pressuring our trading partners to drop their barriers to trade. This summer Japan announced a major program that will chop away many of the byzantine inspection and certification procedures that presently tie up imports. However, many U.S. officials were angered that the Japanese program takes effect partly in 1987, partly in 1986.

"It's outrageous that Japan denies us full access to their market when they've been so successful in ours," said Mr. Feketekuty of the U.S. Trade office.

At least Japan no longer requires U.S. cigarette exporters to Japan to advertise in English. But foreign carmakers still can't sell through dual dealerships, which sell two companies' cars. That's how Japan built up its market share here at first. Still, Detroit appears so little interested in selling in Japan that it doesn't even make cars with right-hand drive for the Japanese roads.

Americans could compete worldwide better if we had a tax system similar to Japan's or Europe's. Japan levies a commodity tax on goods; the tax varies by product. European nations levy a standard 15-20-pct value-added tax (VAT) that taxes most items the same amount. Since Europe and Japan don't levy these taxes on exports, their tax systems encourage exports.

The U.S., in contrast, uses individual and corporate income taxes. These add to the cost of each employee and each product—and can't be taken off exports from the U.S.

"Our tax system subsidizes imports and penalizes exports," said Mr. Fox of the NAM. "Ultimately we're going to have to go to some form of value-added tax."

Besides cutting government spending, encouraging economic growth in Europe and Japan, and reforming our tax system, the best way to cut our trade deficit is to increase the productivity and technological competitiveness of our nation's industries. That's the true way to win customers here and abroad. And that's what American industry is doing through the kind of bold attempts at design and manufacturing innovation symbolized by General Motors' Saturn project.

"Free trade is fair trade," Undersecretary Jones told *Iron Age*. "It's when you manipulate it—as we do through the government deficits—that it's not fair.

"Now I'm not stupid or naive enough to say there is free trade throughout the world or that the playing field for world trade is level. But if we turn to protectionism, the playing field will become even less level.

"Instead, I would like to see us move even further toward free trade. The solution to our trade problems today is to have less protectionism around the world, not more." ☐

PRICE & PRODUCTION DATA

(Effective November 11, 1985)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	171	176	176	127
Pittsburgh	148	155	161	195
Youngstown	97	94	90	90
Lake Erie	122	146	139	109
Detroit	152	150	149	143
Chicago	467	439	488	411
Cincinnati	83	80	78	84
St. Louis	72	73	75	68
Southern	184	188	194	176
Western	77	82	86	66
U.S. Production	1,578	1,583	1,636	1,469

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 50¢ premium.

Pellets (per iron unit natural	gross-ton 59.4*
Pellets (per iron unit natural	gross-ton 72.5-86.9**
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53***

*59.4¢—Pickands Mather 8/1/85, delivered hold of vessel, upper lake ports.
**72.5¢—U.S. Steel as of 8/16/85. **86.9¢—Oglebay Norton 3/23/82, Hanna Mining and Cleveland-Cliffs 2/26/82. ***Effective 5/1/83.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective November 11, 1985)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,573	1,583	75,365	79,932
Capability Utilization Rate	61.8	62.2	65.7	68.9

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	27.582
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 68.83	$ 68.83	$ 71.50	$ 79.17
No. 2 bundles	$ 50.83	$ 51.17	$ 52.50	$ 51.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 69.50	$ 69.50	$ 73.50	$ 81.50
No. 1 steel, Philadelphia	67.50	67.50	68.50	75.50
No. 1 steel, Chicago	69.50	69.50	72.50	80.50
No. 1 bundles, Detroit	56.50	56.50	66.50	64.50
Low Phos., Youngstown	66.50	65.50	69.50	72.50
No. 1 mach'y cast., Pgh	68.50	68.50	71.50	66.50
No. 1 mach'y cast., Phila	91.50	91.50	91.50	98.50
No. 1 mach'y cast., Chi	97.50	97.50	99.50	110.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative basing points within the U.S.
***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective November 11, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	42.84	42.79	11/11/85
Copper (C)	66.00-67.00	65.50-67.00	11/8/85
Lead	18.75-19.00	18.50-19.00	10/30/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	183.18	184.96	11/11/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	35.00	38.00	11/6/85

ALUMINUM: Avg. for last week & previous week. COPPER (C): cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00-1.25
Calcium, ton lots, crown	$3.76
Chromium, 99.8%	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$323.35
Indium, dollars per troy oz.	$2.50
Iridium, dollars per troy oz.	$430.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb. f.o.b. N.Y.	$315.00-330.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$6.85
Nickel electro (PDCR)	$3.29
Palladium, per troy oz.	$101.00
Platinum, per troy oz.	$326.00
Rhodium, per troy oz.	$1,085.00
Silver ingots, per troy oz.	$6.00
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

Nov. 4—TRADING
Nov. 5—SUSPENDED
Nov. 6—
Nov. 7—
Nov. 8—

Scrap Prices
Brass Mill Scrap

(Cents per lb., over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	60	50½
Yellow brass	52	43¼
Red brass	55¾	46
Comm. bronze	57⅛	46¾
Mang. bronze	44¾	43¼
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	57
No. 2 copper wire	48
Light copper	39

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	44
Light copper	35
No. 1 composition	46
No. 1 comp. turnings	44
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	30
Radiators	35

Aluminum

New mixed clips	32	— 33
Old sheet	29	— 30
Old cast	29	— 30
Clean dry borings	30	— 31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	24	— 26
Mixed L.C. clips	21	— 22
Old sheets and cast	20	— 21
Borings and turnings	16	— 18
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 39
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	115	—125
Nickel rod ends	115	—125
Nickel sheets, clips	115	—125
Nickel turnings	25	— 35

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

Cleveland and Youngstown price reporting change

Effective Nov. 11, *Iron Age* changed its method of reporting scrap prices in **Cleveland** and **Youngstown** from consumer delivered prices to broker buying prices.

In addition, *Iron Age* will no longer list the Cleveland prices of mixed borings and turnings, drop forge flashings, steel axle turnings, railroad cast, cupola cast and stove plate, since the volume of business in these grades is minimal. *Iron Age* will begin listing Cleveland prices for mixed cast and plate and structural steel, 5 ft and under.

For additional information, write to Michael Marley, Managing Editor, Iron Age, Chilton Co., Chilton Way, Radnor, Pa. 19089.

EFFECTIVE NOVEMBER 11,1985

(Effective November 11,1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	84.00 to	85.00
No. 1 factory bundles (auto)	84.00 to	85.00
No. 2 bundles	50.00 to	51.00
No. 1 busheling	84.00 to	85.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	38.00 to	39.00
Low phos. punchings plate	90.00 to	91.00
Heavy turnings	63.00 to	64.00
No. 1 RR hvy. melting	77.00 to	78.00
Rails, 2 ft. and under	96.00 to	97.00
Scrap rails, random lgth	75.00 to	76.00
RR specialties	92.00 to	93.00
No. 1 machinery cast	68.00 to	69.00
Cupola cast	61.00 to	62.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	515.00 to	525.00
18-8 turnings	415.00 to	425.00

Chicago

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	81.00 to	82.00
No. 1 factory bundles (auto)	81.00 to	82.00
No. 2 dealer bundles	56.00 to	57.00
No. 1 busheling	79.00 to	80.00
Shredder scrap	79.00 to	80.00
Machine shop turnings	38.00 to	39.00
Mixed borings and turnings	40.00 to	41.00
Shoveling turnings	42.00 to	43.00
Cast iron borings	42.00 to	43.00
Low phos. forge crop	93.00 to	94.00
Low phos. punchings plate 1/4 in. and heavier	109.00 to	110.00
Low phos. 2 ft. and under	104.00 to	105.00
No. 1 RR hvy. melting	73.00 to	74.00
Scrap rails random lgth	74.00 to	75.00
Reroller rails	96.00 to	97.00
Rails, 2 ft. and under	97.00 to	98.00
RR couplers and knuckles	82.00 to	83.00
RR car axles	98.00 to	99.00
No. 1 machinery cast	97.00 to	98.00
Cupola cast	85.00 to	86.00
Stove plate	87.00 to	88.00
Steel car wheels	82.00 to	83.00
Stainless		
18-8 bundles and solids	500.00 to	510.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	130.00 to	135.00
430 turnings	95.00 to	100.00

Philadelphia

No. 1 hvy. melting	$ 66.00 to	$ 69.00
No. 2 hvy. melting	57.00 to	60.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	44.00 to	47.00
No. 1 busheling	80.00 to	83.00
Shredder scrap	81.00 to	84.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	73.00 to	76.00
Low phos. 2 ft. punchings	94.00 to	97.00
Electric furnace bundles	79.00 to	82.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	98.00 to	101.00
Cupola cast	76.00 to	79.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	90.00 to	93.00

Detroit

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	46.00 to	47.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	22.00 to	23.00
No. 1 busheling	55.00 to	56.00
Drop forge flashings	34.00 to	35.00
Machine shop turnings	30.00 to	31.00
Mixed borings and turnings	12.00 to	13.00
Shoveling turnings	30.00 to	31.00
Cast iron borings	16.00 to	17.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	47.00 to	48.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	455.00 to	465.00
18-8 turnings	340.00 to	350.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 57.00 to	$ 58.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 dealer bundles	33.00 to	34.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Low phos. plate	66.00 to	67.00
Electric furnace bundles	58.00 to	59.00
Galvanized bundles	56.00 to	57.00

Cleveland

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	71.00 to	72.00
No. 1 factory bundles	49.00 to	50.00
No. 2 bundles	30.00 to	31.00
No. 1 busheling	62.00 to	63.00
Machine shop turnings	22.00 to	23.00
Shoveling turnings	22.00 to	23.00
Cast iron borings	15.00 to	16.00
Cut structural & plates, 5 ft. and under	63.00 to	64.00
Cut structural & plates, 2 ft. and under	81.00 to	82.00
Low phos. punchings plate	81.00 to	82.00
Foundry steel, 2 ft. & under	47.00 to	48.00
No. 1 RR hvy. melting	53.00 to	54.00
Rails, 2 ft. and under	82.00 to	83.00
Rails, 18 in. and under	84.00 to	85.00
No. 1 machinery cast	73.00 to	74.00
Mixed cast	40.00 to	41.00
Stainless		
18-8 bundles	440.00 to	450.00
18-8 turnings	325.00 to	335.00
430 bundles	100.00 to	110.00

Buffalo

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	40.00 to	41.00
No. 1 busheling	65.00 to	66.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	15.00 to	16.00
Mixed boring and turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	23.00 to	24.00
Low phos. plate	73.00 to	74.00
Structural and plate, 2 ft. and under	77.00 to	78.00
Rails, 2 ft. and under	79.00 to	80.00
Scrap rails, random lgth	64.00 to	65.00
No. 1 machinery cast	77.00 to	78.00
No. 1 cupola cast	59.00 to	60.00

St. Louis

No. 1 hvy. melting	$ 42.00 to	$ 43.00
No. 2 hvy. melting	31.00 to	32.00
Foundry steel, 2 ft.	36.00 to	37.00
No. 1 dealer bundles	42.00 to	43.00
No. 2 bundles	27.00 to	28.00
Machine shop turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	53.00 to	54.00
Rails, random length	59.00 to	60.00
Rails, 18 in. and under	72.00 to	73.00
RR specialties	70.00 to	71.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	89.00 to	90.00
Steel car wheels	81.00 to	82.00
Rerolling rails	69.00 to	70.00
Unstripped motor blocks	64.00 to	65.00

Birmingham

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	70.00 to	71.00
Shredder scrap	84.00 to	85.00
Machine shop turnings	24.00 to	25.00
Shoveling turnings	38.00 to	39.00
Cast iron borings	37.00 to	38.00
Electric furnace bundles	65.00 to	66.00
Elec. furnace, 3 ft. & under	66.00 to	67.00
Structural and plate, 2 ft.	86.00 to	87.00
Structural and plate, 4 ft.	83.00 to	84.00
No. 1 RR hvy. melting	83.00 to	84.00
Scrap rails, random lgth	69.00 to	70.00
Rails, 2 ft. and under	87.00 to	88.00
Angles and splice bars	83.00 to	84.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	74.00 to	75.00

Cincinnati

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	15.00 to	16.00
Low phos. 18 in. and under	79.00 to	80.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	74.00 to	75.00
No. 1 cupola cast	59.00 to	60.00
Heavy breakable cast	24.00 to	25.00
Drop broken cast	71.00 to	72.00

New York

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	450.00 to	475.00
18-8 turnings	350.00 to	375.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	17.00 to	19.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	13.00 to	14.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 77.00
No. 2 hvy. melting, cut 2 ft. and under	70.00
No. 1 dealer bundles	81.00
No. 2 bundles	53.00
Mixed steel scrap	48.00
Bush. new fact. prep'd	81.00
Bush. new fact. unprp'd	64.00
Machine shop turnings	34.00
Short steel turnings	34.00
Mixed borings and turnings	19.00
Cast scrap	86.00

Houston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	54.00 to	55.00
No. 2 bundles	40.00 to	41.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	30.00 to	31.00
Shredder scrap	74.00 to	75.00
Cut structural plate, 2 ft. and under	97.00 to	98.00
Cut structural plate, 5 ft. and under	79.00 to	80.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	83.00 to	84.00

PRODUCER KEY

With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens, Inc., Coatesville, Pa.

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Nelsen Steel & Wire Co., Chicago
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., North Tonawanda, N.Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Corp., Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh

W3 Weirton Steel Corp., Weirton, W. Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh
W14 Whittar Steel Strip Div., Whittar Industries Ltd., Detroit

STEEL SERVICE CENTER PRICES — Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
City Delivery Charge*	Hot Rolled (10 gage)	Cold Rolled (20 gage)	Galvanized (16 gage)	Hot Rolled Strip	Plates	Standard Structurals	Hot Rolled (merchant)	Cold Finished	Hot Rolled 8620 As Rolled	Hot Rolled 4140 Annealed	Cold Drawn 8620 As Rolled	Cold Drawn 4140 Annealed
Atlanta	24.47	30.20	33.60	27.11	24.88	23.22	21.05	28.73	35.62	45.15	61.11	68.69
Baltimore	24.42	28.56	34.02	31.13	30.35	28.49	23.78	33.08	46.54	51.09	60.71	67.59
Birmingham	23.10	27.21	33.60	26.50	23.68	23.33	22.35	29.13	43.72	49.95	62.21	68.87
Boston	31.27	36.67	43.12	40.37	31.23	29.70	25.01	32.57	38.73	40.76	53.18	56.78
Buffalo	28.27	33.11	39.73	34.18	28.37	25.84	21.26	30.07	37.80	38.76	48.09	54.63
Chicago	26.12	32.40	36.03	24.32	21.92	20.59	19.30	24.99	29.30	36.60	45.87	51.04
Cincinnati	27.00	32.53	35.92	25.04	24.66	19.88	18.68	26.34	31.24	37.71	46.13	51.02
Cleveland	25.88	31.76	35.64	27.64	24.19	22.15	19.05	28.25	34.10	37.75	46.37	52.37
Denver	28.59	34.76	34.44	31.37	26.86	24.20	21.49	34.15	44.04	51.11	57.76	65.98
Detroit	26.74	32.75	36.33	24.25	24.66	20.50	19.06	26.32	31.14	37.38	46.18	51.68
Houston	25.13	26.65	30.33	33.36	24.72	24.31	22.05	36.65	42.12	42.29	57.26	63.87
Kansas City	27.93	34.26	36.90	26.91	25.35	21.25	18.40	30.97	36.41	40.14	48.48	52.94
Los Angeles	24.54	28.33	35.08	28.92	26.27	32.05	27.09	34.71	46.00	51.34	60.91	67.53
Memphis	22.04	30.19	31.64	26.95	24.43	24.15	21.65	30.50	33.71	44.50	58.09	65.99
Milwaukee	26.34	32.16	35.82	26.31	24.99	21.28	19.27	25.16	32.23	37.07	45.39	51.03
New York	29.50	35.68	40.14	37.27	30.67	25.04	22.47	33.05	36.74	41.73	48.51	53.25
Philadelphia	25.48	32.23	38.45	38.00	27.96	26.10	22.25	29.00	37.35	42.37	53.56	58.40
Pittsburgh	36.26	37.38	42.78	34.16	33.37	27.78	25.62	27.40	35.31	39.45	48.45	52.19
Portland	26.29	29.06	36.46	31.19	32.56	34.45	27.54	37.58	46.18	51.95	67.18	.....
San Francisco	24.44	29.33	35.87	29.08	25.69	29.86	27.16	35.30	47.99	51.84	60.96	67.53
Seattle	27.68	27.83	35.47	27.95	21.37	27.40	27.15	35.25	43.61	52.61	67.23	67.28
Spokane	21.04	28.24	28.65	32.25	32.02	33.63	23.45	36.94	39.45	42.47	.....	56.28
St. Louis	26.42	29.43	29.84	26.78	23.57	19.95	19.63	29.16	34.95	38.39	46.97	51.88
St. Paul	26.21	31.17	31.58	30.82	23.67	26.52	19.13	28.60	34.40	37.59	45.97	51.42

Base Quantities: All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—1/8" x 1"; Plate 1/4" x 84; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds 3/4-2 15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1-5/8" round; Cold drawn—1" round; Hot-rolled 4140—1-5/8" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

Codes identify Producers listed on p. 64. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(2)	$473.00
C10, U1	$473.00
R3	$453.00
Midwest	
R3, W5	$453.00
U1	$473.00
S1, I3	$473.00
C10	$473.00
K2	$473.00
West	
C6	$420.00
Alloy, East	
R3	$492.00
B3	$512.00
U1, C10	$512.00
Midwest	
W5	$492.00
U1, I3	$512.00
C10	$512.00
R3	$492.00
S1	$512.00
West	
C6	$469.00

Structurals

Carbon, East	
B3	22.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3	23.90
T10	23.90
N4	23.90
South	
C16	23.90
T10	22.90
High-Strength, Low Alloy, East	
B3	22.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
South	
C16	23.90
Wide Flange, Carbon, East	
B3	22.90
U1	22.75
J3	23.90
Midwest	
U1	22.75
N4	23.90
I3	23.90
Wide Flange, High Strength-Low Alloy, East	
U1	24.30
Midwest	
U1	24.30

Strip

Hot-Rolled, Carbon, Cut II Edge—all widths, East	
U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1	23.75
U1, A7	23.75
I3, B3	23.75
M2	22.05
R3	22.05
South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
S10	29.60
P15	24.80
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge, All widths, (plus extras)*	
Midwest	
M2, R3	22.05
W3, J3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge	
Midwest	
S1	37.05
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	26.10
I4	25.20
Alloy, Cold-Rolled East (plus extras)*	
E4,M8	43.35
B4	49.75
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	23.75
J3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5	23.75
S1, B3	23.75
I3, A7	23.75
West	
U1	24.25
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2)	28.15
J3	26.15
U1	28.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.85
J3	26.15
D1	26.15
U1, W5	28.15
S1, B3	28.15
I3, A7	28.15
West	
U1	28.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	30.30
U1	30.30
Midwest	
J3, D1, W3	28.00
R3, Y1	28.00
G2, M11	30.00
U1, W5	30.30
S1	30.30
I3	30.30
A7	30.30
West	
U1	30.80
South	
R3	28.00
Enameling, Midwest	
U1, S1	29.65
I3, A7	29.65
J3	27.65
Long-Terne, Midwest	
W5, A7, U1	31.65
R3	29.35

Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate Single Reduced (70 lb)	
East	per base box
J3	26.29
U1	30.12
Midwest	
U1	30.12
J3	26.29
M11	27.54
W3	26.29
W5	28.99
West	
U1	30.62
South	
U1	30.12
Double Reduced (55 lb)**	
Midwest	
M11	21.95
J3	21.49
U1	24.33
W3	21.49
W5	23.38
West	
U1	24.83
South	
U1	24.33
Black Plate Single Reduced (70 lb)*	
East	
B3	24.81
Midwest	
J3, W3	24.01
I3	24.57
W5	25.55
U1	26.55
M11	26.27
West	
U1	26.55
Double Reduced (55 lb)	
East	
B3	20.49
Midwest	
U1	21.32
M11, W5	20.49
W3, J3	18.93
West	
U1	21.32
South	
U1	21.32

*75 lb—base weight extra 69¢
**50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3, R5	25.80
J3	25.80
U1	27.05
C10	27.05
B3	27.05
Midwest	
I4	26.00
U1, I3	27.05
R3, T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
T11, S8	31.00
J3(4), L2	31.00
M8, W10	31.00
N1	24.475
R4, B4	33.25
C10	31.00
Midwest	
W10, R3	33.25
J3	31.00
B1	33.45
L2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
West	
R3	37.15
South	
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
R5, K3	27.95
R3, J3	27.95
U1	29.20
B3	29.20
C10	29.20
Midwest	
R3	27.95
I3, C10, U1	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold-Drawn, East	
L2	35.20
R3, N1	37.90
R4	37.10
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
Midwest	
R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
L2	34.85
B5, M9	38.60
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3	23.25
L4, U1	25.75
P2	23.25
J3	26.75
Midwest	
B3	23.25
I3	25.75
J3, A7	22.80
U1, I4, S1	25.75
R3	26.75
West	
U1	25.75
O2	23.00
South	
R3	25.75
U1	25.75
Alloy East	
B3	31.05
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	31.05
I4, U1	33.55
West	
O2	31.00
South	
U1	33.55

Wire

Carbon Steel Wire, East	
B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

IT'S BEEN A YO-YO YEAR FOR ORDERS

This year, so far, has been a yo-yo year for orders received by durable goods producers.

In September, orders totaled $106.8 billion, down 0.8 pct from the previous month. That was the fourth 'minus' month over the nine months of completed orders data so far this year.

"There has been no clear orders trend this year," stated one economist. "Instead, there has been a collection of differing trends." He made the point that orders' dollar volume in September was up only 1.3 pct from the start of the year. However, just since March, orders expanded by 7.3 pct.

The month-to-month orders decline in September reflected a broad-front weakness in orders. Transportation equipment was down $1.4 billion, or 4.6 pct, to $28.5 billion. This sharp decline was due to a falloff in orders for defense aircraft. Small gains in orders for nondefense aircraft and defense shipbuilding during the month could not offset the defense aircraft drop.

Also down in September were orders for primary metals. These orders fell by 8.6 pct to $10.1 billion.

Finally, there was softness in orders for nonelectrical machinery. Orders for these goods were down 3.6 pct.

The bright side in September came in a solid 14 pct rise in orders for electrical machinery.

It appears that the mood of durable goods producers is one of caution. There has been no buying for inventory. Inventories of durable goods manufacturers, noted the U.S. Labor Dept., "have shown virtually no change in the last three months." In September, a small increase in stocks of transportation equipment makers was more than offset by actual stock trimming by other durable goods producers.

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted **Source: U.S. Dept of Commerce**		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	4th Qtr*	$387.4	$389.5	$368.3
Manufacturing, Total	4th Qtr*	156.0	157.8	147.0
Manufacturing, Durable Goods	4th Qtr*	74.7	75.8	71.4
Mining Industry	4th Qtr*	15.8	16.3	17.0
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	Sept.	106.8	107.7	98.2
Shipments	Sept.	103.2	105.3	98.2
Inventories	Sept.	192.1	192.0	188.6
Unfilled Orders	Sept.	357.2	353.5	350.3
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	Sept.	29.0	27.6	27.4
Capital Goods Producers Defense Industries	Sept.	8.5	10.3	7.3
Primary Metals, Total	Sept.	10.1	11.0	10.1
Steel (SIC 331)	Sept.	4.2	4.8	4.0
Iron & Steel Castings (SIC 332)	Sept.	1.3	1.3	1.2
Nonferrous Metals	Sept.	4.6	4.9	4.9
Nonelectrical Mach.-Equip. Industries, Total	Sept.	17.2	17.8	17.8
Engines & Turbines	Sept.	1.2	1.3	1.3
Farm Machinery & Equipment (Shipments)	Sept.	0.9	0.9	0.8
Construction, Mining & Mat. Hdlg. Equip	Sept.	2.6	2.9	2.8
General Industrial Machinery	Sept.	1.5	1.3	1.5
Fluid Power Equipment** (Index-1972=100)	Sept.	273.0	277.0	265.0
Metalworking Machinery	Sept.	1.0	0.7	1.0
Machine Tools, Total ($Mill., Unadjusted)***	Sept.	171.7	184.5	286.3
Machine Tools, Metalcutting***	Sept.	120.8	130.8	222.2
Machine Tools, Metalforming***	Sept.	50.9	53.7	64.1
Electrical Mach. & Equip. Industries, Total	Sept.	16.7	14.7	16.6
Elec. Transmission Equip. & Ind. Apparatus	Sept.	2.0	2.2	2.1
Household Appliances	Sept.	1.5	1.3	1.4
Communication Equipment	Sept.	6.7	5.1	5.8
Transportation Equipment, Total	Sept.	28.5	29.9	22.6
Motor Vehicles & Parts (Shipments)	Sept.	17.3	17.1	14.6
Aircraft, Missiles & Parts	Sept.	9.7	11.3	7.1
Shipbuilding & Military Tanks	Sept.	0.9	0.4	0.6
Fabricated Metal Products, Total	Sept.	14.7	15.6	12.0
Instruments, Total	Sept.	4.5	4.8	4.5

*Est.—Commerce Dept; **Source: National Fluid Power Assn.; ***Source: NMTBA.

CHILTON'S

IRON AGE

MANUFACTURING MANAGEMENT

December 20, 1985

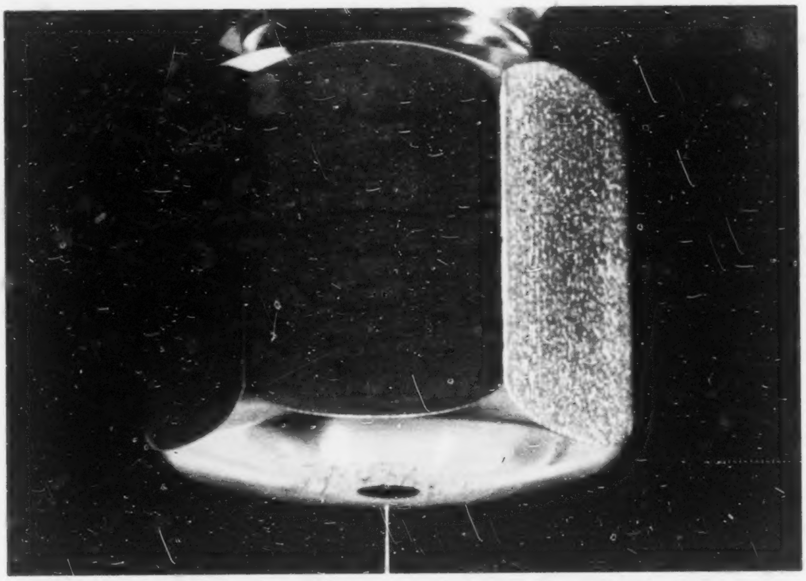
NEW AND OLD TECHNOLOGIES SOLVE CUTTING AND MACHINING PROBLEMS

WHY PLANT SPENDING TRENDS HAVE GONE HAYWIRE

FACTORY COMPUTERS THAT NEVER FAIL

DECEMBER 20, 1985 VOL. 228, NO. 24

CHILTON'S
IRONAGE
MANUFACTURING MANAGEMENT



Editorial 7
How could I resist this guy?

Newswatch 13
Will MAP 'mark the beginning of a third industrial revolution?'

Machine Tool Report 20
Machine tool builders need competitive aid.

You and Your Job 22
Precise hiring language may avoid costly law suits.

Metal Cutting 24
New and old technologies solve cutting and machining problems.

Forging 35
Forgers are putting the hammer on efficiency.

Capital Spending 38
A new puzzle: Where is plant spending headed?

Fail Safe 44
The need for computers that don't break down is critical.

Perceptron 49
This machine vision company keeps its eye on the auto.

Technically Speaking 52
X-ray scanner looks inside turbine blades.

Materials Report 62
Steelmakers remain cautious despite the rise in orders.

Price Trends 68
Price peace holds in face of big auto hikes.

Next Issue: Iron Age's Annual Manufacturing Forecast.

Departments

EDITORIAL STAFF 8
LETTERS 8
INDUSTRIAL BRIEFS 18
PERSONNEL TOUCH 53
PRODUCT & EQUIPMENT REVIEW 54
AD INDEX 58
BUSINESS STAFF 58
MANAGEMENT SERVICE CARD 59
FREE LITERATURE 61
P&P DATA 11/25 64
FERROUS SCRAP 11/25 65
CLEARING HOUSE 66

IRON AGE (USPS 269 780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year, $85 Canada/Foreign (24 issues). Metalsproducer edition—$30 one year, $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable: Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077

Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES

PRICE & PRODUCTION DATA

(Effective November 25,1985)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	166	163	181	178
Pittsburgh	204	178	156	161
Youngstown	102	100	94	60
Lake Erie	122	124	144	115
Detroit	145	157	146	144
Chicago	463	478	476	418
Cincinnati	82	80	82	90
St. Louis	77	80	73	67
Southern	208	202	205	168
Western	81	83	69	62
U.S. Production	1,650	1,645	1,626	1,463

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8/13/85. **59.4¢—Pickands Mather, 8/1/85 delivered hold of vessel, upper Lake ports. ***72.5¢—U.S. Steel as of 8/16/85 86.9¢—Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs, 2/26/82

STEEL PRODUCTION, COMPOSITE PRICES

(Effective November 25,1985)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,650	1,645	78,839	82,941
Capability Utilization Rate	64.9	64.7	65.8	68.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	27.582
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 68.83	$ 68.83	$ 70.17	$ 78.50
No. 2 bundles	$ 50.83	$ 50.83	$ 51.50	$ 51.17

Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 69.50	$ 69.50	$ 73.50	$ 79.50
No. 1 steel, Philadelphia	67.50	67.50	67.50	75.50
No. 1 steel, Chicago	69.50	69.50	69.50	80.50
No. 1 bundles, Detroit	56.50	56.50	63.50	64.50
Low Phos., Youngstown	66.50	66.50	67.50	72.50
No. 1 mach'y cast., Pgh	68.50	68.50	71.50	66.50
No. 1 mach'y cast., Phila	91.50	91.50	91.50	98.50
No. 1 mach'y cast., Chi	97.50	97.50	97.50	110.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective November 25,1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	43.43	42.62	11/25/85
Copper (C)	65.00-66.00	64.50-66.00	11/22/85
Lead	18.75-19.50	18.75-19.00	11/8/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	181.59	184.17	11/25/85
Zinc	35.00	38.00	11/6/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.25-1.50
Calcium, ton lots, crown	$3.92
Chromium, 99.8%	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$330.45
Indium, dollars per troy oz.	$2.50
Iridium, dollars per troy oz.	$430.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb. f.o.b. N.Y.	$320.00-330.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.15-3.30
Nickel electro (PDCR)	$3.29
Palladium, per troy oz.	$100.00
Platinum, per troy oz.	$335.00
Rhodium, per troy oz.	$1,085.00
Silver ingots, per troy oz.	$6.28
Titanium sponge, melt grade	$3.50-3.75
Tungsten powder, yld red.	$9.00-9.50
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

Nov. 18—TRADING
Nov. 19—SUSPENDED
Nov. 20—
Nov. 21—
Nov. 22—

Scrap Prices
Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	60	50½
Yellow brass	52	43¼
Red brass	55¼	46
Comm. bronze	57⅛	46¼
Mang. bronze	44¼	43¼
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	47
Light copper	38

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	51	
No. 2 copper wire	43	
Light copper	34	
No. 1 composition	46	
No. 1 comp. turnings	44	
Hvy. yellow brass solids	33	
Hvy. yellow brass turnings	30	
Radiators	35	
Aluminum		
New mixed clips	31	— 32
Old sheet	29	— 30
Old cast	29	— 30
Clean dry borings	30	— 31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum		
Segregated clippings	24	— 26
Mixed L.C. clips	21	— 22
Old sheets and cast	20	— 21
Borings and turnings	16	— 18
Duraluminum clippings	24	— 25

Copper and Brass		
No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 39
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead		
Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel		
Nickel solids	115	—125
Nickel rod ends	115	—125
Nickel sheets, clips	115	—125
Nickel turnings	25	— 35

Zinc		
New zinc clippings	17	— 18
Old diecast zinc	13	— 14

EFFECTIVE NOVEMBER 25,1985

(Effective November 25 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	82.00 to	83.00
No. 1 factory bundles (auto)	87.00 to	88.00
No. 2 bundles	50.00 to	51.00
No. 1 busheling	81.00 to	82.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	38.00 to	39.00
Low phos. punchings plate	90.00 to	91.00
Heavy turnings	63.00 to	64.00
No. 1 RR hvy. melting	78.00 to	79.00
Rails, 2 ft. and under	97.00 to	98.00
Scrap rails, random lgth	72.00 to	73.00
RR specialties	93.00 to	94.00
No. 1 machinery cast	68.00 to	69.00
Cupola cast	61.00 to	62.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	515.00 to	525.00
18-8 turnings	415.00 to	425.00

Chicago

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	85.00 to	86.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	56.00 to	57.00
No. 1 busheling	79.00 to	30.00
Shredder scrap	79.00 to	80.00
Machine shop turnings	38.00 to	39.00
Mixed borings and turnings	40.00 to	41.00
Shoveling turnings	42.00 to	43.00
Cast iron borings	42.00 to	43.00
Low phos. forge crop	93.00 to	94.00
Low phos. punchings plate		
1/4 in. and heavier	109.00 to	110.00
Low phos. 2 ft. and under	104.00 to	105.00
No. 1 RR hvy. melting	73.00 to	74.00
Scrap rails random lgth	74.00 to	75.00
Reroller rails	96.00 to	97.00
Rails, 2 ft. and under	97.00 to	98.00
RR couplers and knuckles	82.00 to	83.00
RR car axles	98.00 to	99.00
No. 1 machinery cast	97.00 to	98.00
Cupola cast	85.00 to	86.00
Stove plate	87.00 to	88.00
Steel car wheels	82.00 to	83.00
Stainless		
18-8 bundles and solids	500.00 to	510.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	130.00 to	135.00
430 turnings	95.00 to	100.00

Philadelphia

No. 1 hvy. melting	$ 66.00 to	$ 69.00
No. 2 hvy. melting	57.00 to	60.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	44.00 to	47.00
No. 1 busheling	80.00 to	83.00
Shredder scrap	80.00 to	83.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	73.00 to	76.00
Low phos. 2 ft. punchings	94.00 to	97.00
Electric furnace bundles	82.00 to	85.00
RR specialties	73.00 to	76.00
Rails, 2 ft. and under	98.00 to	101.00
Cupola cast	76.00 to	79.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	90.00 to	93.00

Detroit

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	46.00 to	47.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	22.00 to	23.00
No. 1 busheling	55.00 to	56.00
Drop forge flashings	34.00 to	35.00
Machine shop turnings	30.00 to	31.00
Mixed borings and turnings	12.00 to	13.00
Shoveling turnings	30.00 to	31.00
Cast iron borings	16.00 to	17.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	47.00 to	48.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	455.00 to	465.00
18-8 turnings	340.00 to	350.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 57.00 to	$ 58.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 dealer bundles	33.00 to	34.00
Machine shop turnings	2[illegible].00 to	21.00
Shoveling turnings	20.00 to	21.00
Low phos. plate	66.00 to	67.00
Electric furnace bundles	58.00 to	59.00
Galvanized bundles	56.00 to	57.00

Cleveland

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	71.00 to	72.00
No. 1 factory bundles	52.00 to	53.00
No. 2 bundles	30.00 to	31.00
No. 1 busheling	62.00 to	63.00
Machine shop turnings	22.00 to	23.00
Shoveling turnings	22.00 to	23.00
Cast iron borings	15.00 to	16.00
Cut structural & plates		
5 ft. and under	63.00 to	64.00
Cut structural & plates,		
2 ft. and under	81.00 to	82.00
Low phos. punchings plate	81.00 to	82.00
Foundry steel, 2 ft. & under	47.00 to	48.00
No. 1 RR hvy. melting	53.00 to	54.00
Rails, 2 ft. and under	82.00 to	83.00
Rails, 18 in. and under	84.00 to	85.00
No. 1 machinery cast	73.00 to	74.00
Mixed cast	40.00 to	41.00
Stainless		
18-8 bundles	440.00 to	450.00
18-8 turnings	325.00 to	335.00
430 bundles	100.00 to	110.00

Buffalo

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	40.00 to	41.00
No. 1 busheling	65.00 to	66.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	15.00 to	16.00
Mixed boring and turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	23.00 to	24.00
Low phos. plate	73.00 to	74.00
Structural and plate		
2 ft. and under	77.00 to	78.00
Rails, 2 ft. and under	79.00 to	80.00
Scrap rails, random lgth	64.00 to	65.00
No. 1 machinery cast	77.00 to	78.00
No. 1 cupola cast	59.00 to	60.00

St. Louis

No. 1 hvy. melting	$ 42.00 to	$ 43.00
No. 2 hvy. melting	31.00 to	32.00
Foundry steel, 2 ft.	36.00 to	37.00
No. 1 dealer bundles	42.00 to	43.00
No. 2 bundles	27.00 to	28.00
Machine shop turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	53.00 to	54.00
Rails, random length	59.00 to	60.00
Rails, 18 in. and under	72.00 to	73.00
RR specialties	70.00 to	71.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	89.00 to	90.00
Steel car wheels	81.00 to	82.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	64.00 to	65.00

Birmingham

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	70.00 to	71.00
Shredder scrap	84.00 to	85.00
Machine shop turnings	24.00 to	25.00
Shoveling turnings	38.00 to	39.00
Cast iron borings	37.00 to	38.00
Electric furnace bundles	65.00 to	66.00
Elec. furnace, 3 ft. & under	66.00 to	67.00
Structural and plate, 2 ft.	86.00 to	87.00
Structural and plate, 4 ft.	83.00 to	84.00
No. 1 RR hvy. melting	83.00 to	84.00
Scrap rails, random lgth	69.00 to	70.00
Rails, 2 ft. and under	87.00 to	88.00
Angles and splice bars	83.00 to	84.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	74.00 to	75.00

Cincinnati

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	15.00 to	16.00
Low phos. 18 in. and under	79.00 to	80.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	74.00 to	75.00
No. 1 cupola cast	59.00 to	60.00
Heavy breakable cast	24.00 to	25.00
Drop broken cast	71.00 to	72.00

New York

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	450.00 to	475.00
18-8 turnings	350.00 to	375.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	17.00 to	19.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	11.00 to	12.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under		
(foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 77.00
No. 2 hvy. melting, cut 2 ft. and under	70.00
No. 1 dealer bundles	81.00
No. 2 bundles	53.00
Mixed steel scrap	48.00
Bush., new fact., prep'd	81.00
Bush., new fact., unprp'd	64.00
Machine shop turnings	34.00
Short steel turnings	34.00
Mixed borings and turnings	19.00
Cast scrap	86.00

Houston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	54.00 to	55.00
No. 2 bundles	40.00 to	41.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	30.00 to	31.00
Shredder scrap	74.00 to	75.00
Cut structural plate, 2 ft. and under	97.00 to	98.00
Cut structural plate, 5 ft. and under	79.00 to	80.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	83.00 to	84.00

PRICE PEACE HOLDS IN FACE OF BIG AUTO HIKES

Producer prices in October were on the same flat track they had been on for more than four years.

There was one big exception: Prices of autos and trucks.

Prices of new cars in October rose by 12.1 pct from September. Prices of light trucks (including the popular personal vans), were up 14.5 pct. And prices of heavy trucks were up 6.6 pct.

The surging automotive prices pushed up the U.S. Labor Dept.'s finished goods price index by 0.9 pct from September. This was the steepest monthly rise for finished goods prices since April 1981.

The big October price jump in automotive vehicles is explained by deep discounting of year-end 1985 models and higher prices for 1986 models. October was the month the price changes came home to roost, and be tallied by the price checkers.

A glance at the table here shows clearly that the automotive tag rises were the exception. They stood out like mountains on a prairie.

A point to remember is that the automotive price surge was largely a one-shot proposition. It reflected the jump from a singular low price to a new higher level of prices.

The glance at the table is also reassuring to inflation worry warts. Prices in October slept peacefully while automation markups made all the noise. Seven of the 22 product lines listed on the table showed month-to-month decreases in October. Another four lines showed no price changes.

Further price stability seems to be in the wind. Market demand, as reflected in a third quarter 3.1 pct annual growth rate for the economy, is moderate, and there is still much excess output capacity noted in U.S. industry. At the same time, price-moderating import competition continues to roll on unabated.

Latest Month Covered: October 1985

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	395.7	— 0.6	+ 1.5
Metal Forming Machine Tools	433.2	— 0.4	+ 1.4
Agricultural Machinery & Equip.	337.4	0	0
Construction Machinery & Equip.	363.1	+ 0.1	— 1.6
Industrial Process Furnace & Ovens	389.2	+ 1.0	+ 2.9
Industrial Material Handling Equip.	294.2	— 0.3	+ 1.1
Pumps, Compressors & Allied Equip.	358.3	+ 0.3	+ 2.2
Fluid Power Equip. (Dec. 1970 = 100)	264.8	— 0.1	+ 1.2
Mechanical Power Transmission Equip.	340.5	+ 0.2	+ 3.1
Automobiles	234.8	+ 12.1	+ 4.9
Motor Trucks—Light	312.4	+ 14.5	+ 7.6
Motor Trucks—Heavy	337.6	+ 6.6	+ 2.0
Railroad Equipment	364.3	— 0.1	+ 1.5
Fabricated Metal Structural Products	315.5	+ 0.1	+ 0.5
Electric Motors	351.7	0	+ 2.7
Valves & Fittings (Dec. 1982 = 100)	104.8	— 0.3	+ 1.9
Ball & Roller Bearings	355.0	+ 0.4	+ 3.0
Cutting Tools & Accessories	287.2	+ 0.2	+ 1.9
Heating Equipment	261.5	0	+ 2.1
Plumbing Fixtures & Brass Fittings	314.8	+ 0.4	+ 2.8
Metal Containers	357.7	0	+ 0.1
Miscellaneous Metal Products	302.3	— 0.1	+ 0.3

Data based on U.S. Labor Dept.'s Producer Price Index

C2150-8

CHILTON'S

IRON AGE

MANUFACTURING MANAGEMENT

1986

THE RECOVERY

W

THE BIG EVENTS OF '86

JANUARY 3, 1986 VOL. 229, NO. 1

CHILTON'S

IRONAGE

MANUFACTURING MANAGEMENT

Editorial 7
Will I be wrong—again?

Big Events of 1986 13
This summer could be a long one for steel negotiators.

1986 Annual Forecast 24
A tough, competitive fight is shaping up for metalworking.

STEEL 27
NONFERROUS METALS 29
AUTOMOTIVE 31
MACHINE TOOLS 33
FLUID POWER 33
METAL COATINGS 35
PLASTICS 35
COMPUTERS 36
INSTRUMENTS & CONTROLS 36
CONSTRUCTION EQUIPMENT 39
FARM EQUIPMENT 39
APPLIANCES 40
MATERIAL HANDLING 40
CASTINGS 42
FORGINGS 42
AIRCRAFT 43
ENGINES & TURBINES 43
WELDING 46
HEAT TREATING 46
SCREW MACHINE PRODUCTS 47
FASTENERS 47
STAMPINGS 48
GEARS 48
SHIPBUILDING 52
RAIL CARS 52

Annual Statistical Review 59
Metals' price and production data of 1985.

Next Issue: Corporate Cultures.

Departments

EDITORIAL STAFF 8
AD INDEX 70
BUSINESS STAFF 70
MANAGEMENT SERVICE CARD 71
P&P DATA 12/16 75
FERROUS SCRAP 12/16 76
CLEARING HOUSE 78
STEEL PRICES 80

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year, $85 Canada/Foreign (24 issues). Metalsproducer edition—$30 one year, $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable: Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077.

Chilton abc

ONE OF THE ABC PUBLISHING COMPANIES

1986
THE RECOVERY WON'T RUN OUT OF STEAM

BY JOHN D. BAXTER

The good news for 1986 is that a recession is unlikely.

The bad news is that business growth will be too weak to give any real upward tug to some already-struggling metalworking industries. Still others that did reasonably well last year, may find they are trying to cope with too little too long.

This means simply that 1986 is going to be a tough, competitive alley-fight year for many metalworking companies.

For one reason, a continuing decline in the exchange value of the dollar won't be a lifesaver for trade-battered companies this year. It takes time for the benefits of a dollar fall to take hold. Importers, desperate to hold on to their lush U.S. markets, will face up to lower sales margins on their U.S. business. That means they will cut prices if they must to hold on to these markets.

Too, no forecaster seems to be saying that prices will break out on the upside this year. That means corporate efficiencies, not mere posting of higher tags on products, will be needed to assure profitability—or survival.

Further, there is a special sword hanging over the business scene this year. The Federal tax reform bill that is shaping up could mean an added $25 billion tax burden for industry this year.

While it appears that the corporate income tax rate will be cut, the added business costs due to likely loss of the investment tax credit and to loss of fast writeoffs on capital assets, will result in a net added tax load for U.S. industry.

Clearly, it will be capital-intensive industries that will be hit the hardest by the tax reform as it now shapes up. These industries include most in metalworking.

So, at a time when industrial production levels and plant capacity usage rates are wobbly, capital spending will likely be taking a right to the jaw from the Administration and the Congress.

Two recent major surveys of business executives on their plant investment plans for this year point to little or no change from last year in their outlays.

Iron Age is forecasting a 6 pct increase in plant spending by durable goods manufacturers this year. That may sound good, but that's before inflation. In real terms, the gain probably will be close to 2 pct.

It has to be remembered, also, that capital durable goods include computers and other information/communication equipment as well as well as products of basic goods industries, such as machine tools, construction equipment and so on. It is the computers that will likely be providing much of the growth thrust to business plant investment this year. Computers are making a comeback from a breath-catching pause in market growth last year. But basic goods producers still face low plant operating rates, weak profits, tough competition and thus little incentive—or sometimes the means—to invest heavily.

For many key metalworking industries, 1985 was not a good 'springboard' year. These industries in 1986, as one corporate economist wryly noted, "will hit the ground stumbling as the year opens."

A close look at the all-important flow of orders going to durable goods producers in 1985 shows the less-than-exciting pace that led into this year. Up to November of last year, orders flowing to these manufacturers (85 pct in metalworking), were up 3.3 pct over the same period in 1984. Again, this was in current dollars. In terms of actual volume of goods ordered, it was a wash.

Orders received by some important metals and metalworking industries were actually down over the 10 months last year, even in current dollar terms. Orders received by primary metals producers were down 3.3 pct. New business flowing to makers of nonelectrical machinery fell 1 pct. More importantly, orders going to nondefense capital goods producers were also down 1 pct.

This forecast report takes a look at 1986, not just quarters, as is done in *Iron Age's* quarterly outlook series. So, a look at the numbers in the last two years can bring a clearer view on just how 1986 shapes up—at least, in the view of *Iron Age*.

Gross National Product

In 1984, the U.S. economy grew by 6.8 pct (the strongest year of growth since 1951). In 1985, growth was 2.5 pct. This year, *Iron Age* is in line with many economists who are predicting 3 pct growth.

The perceived growth for this year then is above the widely-accepted 2.5 pct figure that marks a growth recession (growth, but not enough to fully absorb the growing workforce). However, the projected 3 pct expansion is below the nation's long-term average of 3.5 pct.

That 3 pct growth estimated for this year is in real terms, but being an aggregate figure it hides some important undercurrents. For one, service industries will likely outperform manufacturing in 1986.

The really notable reason for the lack of fresh growth thrust in the overall economy this year is found in a bought-out consumer. To an important degree, he has 'spent his wad.' Now, after 38 months of an economic growth cycle, his debt is growing faster than his income and his savings are near a record low point. And it has to be kept in mind that the consumer is the engine that provides two-thirds of all the horsepower in the U.S. economic engine.

In 1984, orders for consumer goods were about 15 pct greater in dollar value than in the previous year. Last year, these orders were up an estimated 3 to 4 pct—a big comedown, as those in many metalworking industries can attest. It was auto industry orders, considered as shipments in that industry, that pulled up this overall gain. Orders in this industry were up 7 pct. Some other key metalworking industries, as noted earlier, experienced actual declines in orders.

The forecast here for 1986 durable goods new orders calls for an increase of 4.9 pct. Again, leavened by an inflation allowance, the real, or increase in volume of goods, will likely come close to 2 pct.

In 1984, capital investment by durable goods producers rocketed. It grew by 16.3 pct over the previous year. Last year, this spending rose by 8.3 pct. That was a strong showing followed the spectacular growth of 1984.

This year, a 6 pct increase in plant investment is forecast. After allowing for inflation, this growth comes out to about 2 pct.

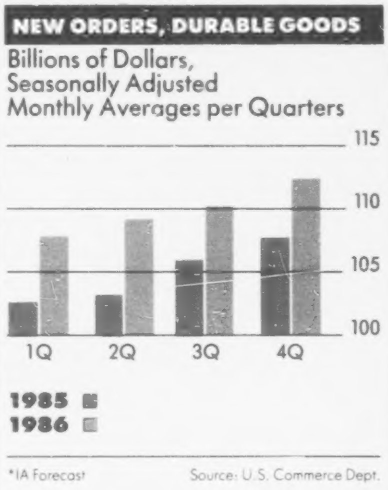
Capital goods producers in this country will probably not see much of that growth. This forecast builds on the data generated by the U.S. Commerce Dept. for 1985. That data reflects what business executives told Commerce officials they intended to expend; it doesn't say *where* they planned to do the spending. Actual spending will often be made overseas for foreign-built equipment. So, factor a big divider into all figures on capital spending by U.S. manufacturers.

In sum, it appears that 1986 is going to be a 'slug-it-out' year for much of U.S. metalworking. Companies will likely be operating in a growth environment—with a restrained, and possibly, lop-sided growth thrust. The year of tepid growth will be tough because it follows a year of little growth for metals and metalworking.

Defense spending should be a bright corner in the 1986 economy. Construction can be expected to be a plus in the economy as office buildings and multi-unit residential buildings continue strong. And the service industries will likely continue to thrive and help keep employment levels up.

However, for basic goods manufacturing industries, cost-cutting, some retrenchment and more restructuring will continue. This will be a year for lowering breakeven points and continuing to build more efficient corporations for the years of opportunity beyond 1986.

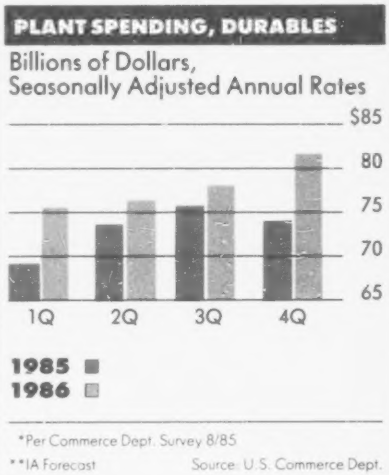
Of course, some companies in metalworking will do better in 1986 because much of their wringing-out and trimming-down has been done. These companies will be able to thrive on the relatively lean pickings of 1986. ☐


NEW ORDERS, DURABLE GOODS

Billions of Dollars,
Seasonally Adjusted
Monthly Averages per Quarters

*IA Forecast

Source: U.S. Commerce Dept.

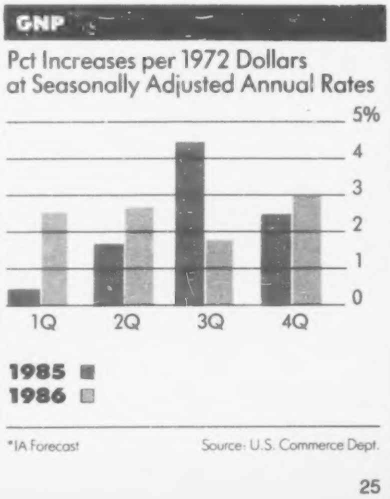

PLANT SPENDING, DURABLES

Billions of Dollars,
Seasonally Adjusted Annual Rates

*Per Commerce Dept. Survey 8/85

**IA Forecast

Source: U.S. Commerce Dept.


GNP

Pct Increases per 1972 Dollars
at Seasonally Adjusted Annual Rates

*IA Forecast

Source: U.S. Commerce Dept.

STEEL

Going into 1986, steel producers are predicting a year a little worse than 1985.

A decline in steel consumption is expected to offset an import reduction and leave steel shipments a little under the 72 million to 73 million tons of last year.

There are two points to be made about the standard forecast. First, it might be wrong in either direction and there are some grounds for wondering if the error might not be on the side of excessive pessimism.

If the estimates are right, steel orders should have dropped in late 1985. Instead, there was a pickup. That could mean steel users are protecting themselves against steel price increases announced for January or the steel market is stronger than anyone expected.

Either explanation would be welcome by steel producers. If the new prices stick, the industry could dig its way out of its profitless pit.

A second point is that the whole year could be scrambled if steel labor negotiations heat up. Steel shipments were stable in 1985. Second half deliveries were only about 1 million tons under the first half's.

In 1986, the threat of a major steel strike could cram an inordinate amount of business into the first half. There would then be a sharp letdown in the second half.

That used to be the standard sequence in years of steel labor negotiations. Steel users would hedge against a strike partly by putting in a lot of extra inventory.

A second hedge was to contract for foreign steel during the period of the possible strike. The full brunt of the ultimate inventory liquidation fell on domestic producers and foreign suppliers made permanent gains in the U.S. market.

To ward off these effects, steel companies and United Steelworkers of America (USWA) entered into a no-strike agreement in the 1970s. That has since been dispensed with and the Steelworkers will be free to strike if there aren't new labor agreements by Aug. 1, 1986.

In this setting, there could be a return to crisis bargaining. Steel management is determined to get concessions and the Steelworkers aren't likely to give ground easily.

It doesn't necessarily follow, however, that there will be a big inventory binge. For one thing, steel users are conditioned today to operating with a minimum of inventory. Just-in-time policies won't be abandoned if there is any alternative.

Apart from labor, the two big influences will be the state of the economy and the steel import trend.

One analyst with a major steelmaker looks for consumption of steel to fall from 95.7 million tons in 1985 to 86.8 million tons in 1986. He pointed out that changes in the Federal Reserve's industrial production index indicated that past estimates of steel consumption were too high. That meant estimates of steel inventories have been too low.

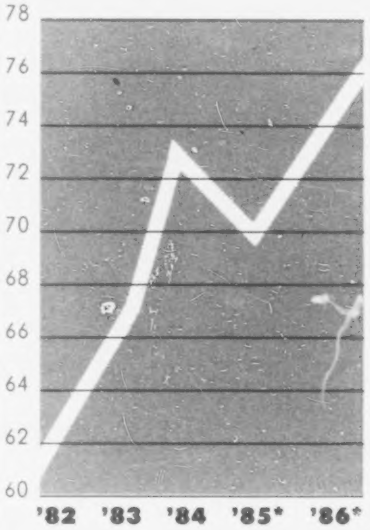
More important, he believes sales of domestic autos will fall by 17.6 pct in 1986. The auto industry has been the main prop of the steel industry for the last three years.

An auto slide would be crushing because there is little relief in sight elsewhere. Machinery, railroad equipment, farm equipment, and other capital items were all expected to show declines in 1986.

The analyst also predicted that steel imports would fall from around 23 million tons in 1985 to 19 million tons in 1986. The 1986 number implied that the Reagan Administration's restraint program would take effect. That was a reasonable assumption, but through most of 1985, the program was ineffective.

If the new steel prices stick, the industry could dig its way out its profitless pit.

Steel Shipments
In Millions of Tons



Source: AISI
*IA estimate

NONFERROUS

If aluminum demand holds up, the bellwether London Metal Exchange price should firm up.

This is supposed to be the year the nonferrous metals companies get a break from the international foreign exchange market. How far they will be able to run with it depends on a lot of other factors, like general economic conditions, interest rate trends and how long John Q. Public's second honeymoon with the automobile lasts.

The base metals companies didn't share in the 1983-84 business recovery, much less its extension into 1985. The demand was there, but price improvement wasn't. The strong U.S. dollar cut into the domestic companies' share of their home market while production levels buoyed by chances for large dollar sales held prices down on domestic and overseas markets.

The dollar began easing off against some key currencies even before the late decision by some leading industrial nations to devise a soft dollar program for 1986. This was paralleled by some easing up of import volume for primary copper and primary aluminum, as well as some downtrend in imports of aluminum mill products and copper and brass products.

It wasn't until the final weeks of the year, that copper and aluminum prices began taking a firmer tone.

The main problem—one that shifting currency values can't cure alone—in 1985 was abundance, or ready availability. In the aluminum industry, for instance, U.S. producers cut their domestic output by nearly 650,000 short tons, or about 24 pct. Their inventory, however, declined by only about half that tonnage. Worldwide producer inventories at the nine-month mark were down only about 370,000 short tons, or about 7.8 pct. The North American companies, according to the International Primary Aluminium Institute, accounted for about 60 pct of the total drop.

However slow producer inventories have been declining, they are going down. If demand holds up, the bellwether London Metal Exchange price should firm up in 1986, easing the pressure on mill product prices, except possibly can stock, where the competition promises to be stiff.

Copper prices were on an uptrend in the latter weeks of 1985. Order and shipment patterns were improving and consumer inventories tended toward the thin side.

Producer and hedge market inventories trended downward last year, albeit unevenly. U.S. refined stocks and hedge market stocks were down, but foreign refiners' stocks were less so.

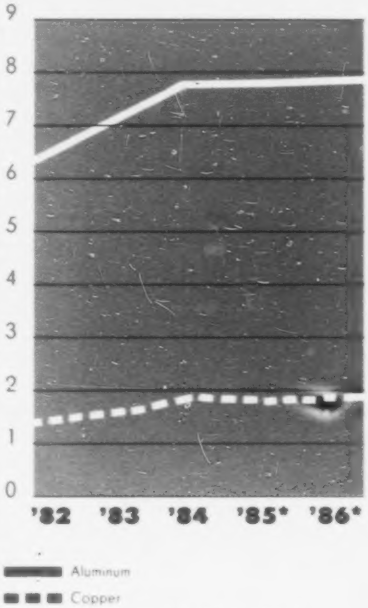
The U.S. companies never got the import program they wanted. They did get a one-third drop in cathode copper imports in 1985, thanks mainly to lower intake from Canada and Chile. Imports of copper and brass mill products also fell last year from record volume in 1984.

With improved market fundamentals, copper analysts project an average cathode price of 75¢ a lb for 1986, compared with 67¢ a lb in 1985. If the import trend holds, this should give surviving U.S. companies some breathing room.

Some major wage pacts have to be renegotiated next Spring and this, combined with the slope in producer and hedge market inventories, could persuade consumers to ease up on their tight inventory policies.

The collapse of the International Tin Council's price support mechanism on the London Metal Exchange last October added to uncertainties on other markets. The price trend in aluminum, nickel and copper had been downward, however. In nickel's case, it took Inco's projected 20 pct slash in nickel production to restore LME values somewhat.

Nonferrous Metals Shipments
In Millions of Short Tons



Source: American Bureau of Metal Statistics, Aluminum Assn
*IA estimate

AUTOMOTIVE

U.S. automakers are likely to sell 7.7 million cars in 1986—500,000 units fewer than the estimated 8.2 million sales in 1985. Foreign automakers probably will sell about 3 million cars in 1986—200,000 more cars than the 2.8 million cars they sold in 1985.

Car and truck sales in the 1985 model year totaled 15.4 million units, which set a new record. That narrowly exceeded the 15.3 million total vehicle sales in the 1978 model year. The model years 1985 and 1978 are the only two years in history that total vehicle sales exceeded the 15-million mark.

Executives at GM are the most optimistic about the outlook for 1986. "We have a real shot at surpassing 15 million units once again in the 1986 model year," said one top GM executive, "and perhaps setting another new record if everything works the way we hope it will." Model years run from October 1 to September 30.

Analysts and executives at the other leading American automakers are more cautious. They are predicting domestic car sales of 7.2-7.4 million in the 1986 calendar year.

Annoyed at its loss of market share over the past ten years, GM is determined to increase sales in 1986. GM is maintaining ambitious production plans for the first quarter of 1986. However, the No. 1 automaker is piling up excess inventories at dealer lots. The excess inventory means that GM is likely to offer low-interest financing to consumers in early 1986 and probably periodically throughout the year. Ford, Chrysler, and American Motors will be forced to follow suit.

Production at all the U.S. automakers will remain strong in the first quarter. Automakers suspect that any downturn in car sales in 1986 will occur in the fourth quarter. "I predict a moderate downturn in the overall economy in late 1986 and early 1987," said an analyst at one Big 3 automaker. "The economy could pick up after that."

Consumer confidence has been holding steady at high levels since 1984. Most analysts expect consumers' willingness to spend to continue to be high in 1986, though down just a little from 1985. The two years of high consumer confidence in 1984-5 are the greatest sustained level of high consumer confidence since the 1960s. Consumer confidence mainly reflects how secure people feel about holding their jobs.

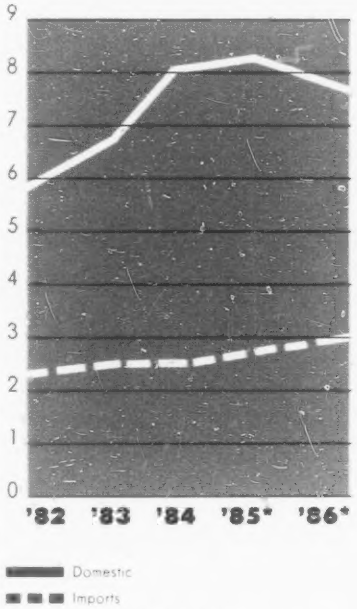
Prolific consumer spending, however, has been financed by record levels of borrowing. "The economic happiness of the American economy today," said one Big 3 analyst, "is based on borrowed money." That means that the current health of the American economy is precarious—and could be endangered by the kinds of bankruptcies and defaults on loans that have hit the farm belt.

Auto analysts predict that consumers' disposable income will increase by 2.4 pct in 1985. That's slightly higher than the 2.2 pct increase in 1985 but nowhere near the 6.7 pct rise in 1984. Auto analysts expect the prime interest rate in 1986 to hover around the 10-pct mark, about the same as in 1985. Likewise, the average interest rates for auto loans should be about the same in 1986 as in 1985: 12.5 pct.

Trucks presently are accounting for the biggest growth rates in the vehicle market. The popular mini vans sold by Chrysler, GM, and Ford are all counted as trucks. An estimated 4.6 million trucks were sold in 1985: an all-time record. Truck sales in 1986 should almost equal that: Auto analysts and executives estimate 4.4 million truck sales in 1986.

Executives at General Motors are the most optimistic about the outlook for 1986.

Automotive Sales
In Millions of Units



Source: Motor Vehicle Manufacturers Assn.
*IA estimate

MACHINE TOOLS; FLUID POWER

MACHINE TOOLS—The outlook for the U.S. machine tool builders did not look promising at the end of 1985. Business was off about 11 pct. and sinking.

The prospects for business to improve depend upon if and when factory capacity utilization rates increase. Where the preferred operating rate is in the 85—90 pct range, operating rates in the U.S. are in the 75—80 pct range and declining.

The non-electrical machinery capacity utilization rate, which is most important for the machine tool industry, is at the 75 pct level, which means that 25 pct of capacity lies unused.

What will American industry do? Two choices are in the offering. One is to outsource; the other is to modernize plant and equipment.

Despite an apparent upward trend to outsource, U.S. manufacturers are beginning to rethink the production process and how they utilize machine tools. As a result, there is a growing interest in flexible machining methods, particularly machining cells, which strengthens the demand for metalcutting machine tools. Builders of large machining systems and special machinery should see increased sales in 1986.

New materials for use in mass production products are also beginning to impact on the machine tool industry. The industry can expect to see more laser- and abrasive waterjet- cutting systems.

Also strengthening the prospects for increased machine tool sales are new, innovative machine tool designs that are only now being introduced. Many of these are aimed at the aircraft engine, aircraft mainframe, and die and mold industries.

Despite the doom and gloom forecasts, the total consumption of domestic-produced and imported machine tools could improve in 1986.

FLUID POWER—After a sharp recovery in 1984 and an uptick in September, fluid power slipped in the fourth quarter and for 1985 will be off about 2 pct on its order rate.

For 1986, most fluid power producers foresee another 1 pct or 2 pct drop in new orders. Some hope for gains of at least 5 pct, and a few hopefuls, riding a wave of new products, say they might be able to squeeze out a 10 pct gain. But these seem to be the exceptions.

The biggest part of the industry is hydraulics, and this was running below the 1984 recovery year in eight of the first nine months of 1985. September was the first month that ran substantially over the 1984 period. Even with that performance in September, however, hydraulic orders as reported by the National Fluid Power Association were running 8 pct under the 1984 recovery.

Pneumatics did better through much of the year. But in the fourth quarter, it stalled. Some producers were reportedly down 20 pct as the year drew to a close.

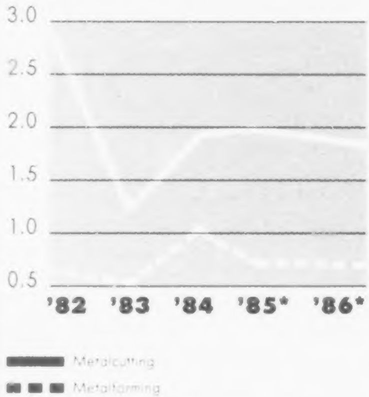
The continuing flat sales book has been related to the impact of imports, the high value of the U.S. dollar that's crimped off-shore sales for U.S. fluid power builders; and the indirect loss of domestic markets as U.S. OEM users of fluid power equipment continued to shift more manufacturing off-shore.

In domestic markets, aerospace and automotive remain the star performers. Neither of these is expected to show much gain during the coming year. Offsetting that solid business base is a continuing drag on capital goods producers, who have been canceling some orders.

It has also kept pricing pinned at low levels, so that unit sales gains haven't been reflected in total dollar volume. For that reason, some dollar forecasts may prove to be high.

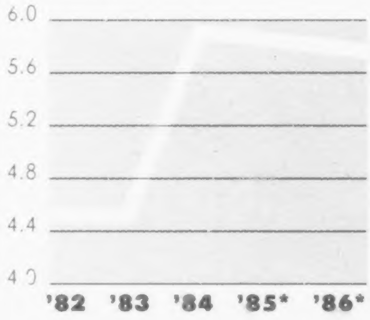
Builders of large machining systems and special machinery expect higher sales in 1986.

Machine Tools
Net New Orders
In Billions of Dollars



Source: National Machine Tool Builders Assn
*IA estimate

Fluid Power, Shipments
In Billions of Dollars



Source: U.S. Department of Commerce and NFPA
*IA estimate

COATINGS; PLASTICS

COATINGS—Industrial-coating companies expect to ship about 307 million gal of coatings in 1986. That's 3 million gal fewer than they shipped in 1985.

Vehicles are the single biggest market for coatings. In 1986, automakers will begin to use the five new electrogalvanizing (EG) lines that come onstream this year. EG steel will replace the Zincrometal steels, which have zinc-rich coatings and are used for outer body panels. However, automakers will not switch from Zincrometal to EG in large volumes until 1987 and 1988.

As Zincrometal body panels are phased out, coating companies plan to target other car parts for coating use. Coil coaters already have had success with windshield wipers and oil filters and plan to market coil to other car parts.

Coil coaters are even hoping to interest automakers in preprimed body panels. "If automakers used coil-coated EG steel," said one coil-coating executive, "that would eliminate the need to prime, phosphatize, and bake body panels in the auto plants." However, the automakers have invested large sums of money in building electrocoat priming systems. That means automakers probably won't consider coil-coated EG steel for several years.

Farm equipment should rebound slightly in 1986 and use coatings. Housing also is expected to remain healthy.

Coil coaters have expected their shipments to the appliance industry to rocket for the past several years. Instead, that market has showed steady, not phenomenal, growth.

Still, the amount of coil-coated steel used for appliances has risen. For 1986, coil coaters expect sales to the appliance industry to drop from 1985 but penetration by coil coatings will increase.

PLASTICS—In plastics, there are the commodities and there are the engineering plastics. The latter, although only at present a small fraction of the entire world of plastics production, is the segment of highest interest to metalworking.

Sales of engineering plastics, according to one qualified observer, were up 3 or 4 pct last year from 1984. The output would have been better had it not been for a slump in the electronics industry.

For 1986, automotive demand for plastics likely will be slow in the first half, then pick up toward the end of the year. The electronics sector should strengthen as well.

"We could have 6 pct growth in engineering plastics in 1986," one forecaster noted. "There are a lot of new applications in the automotive industry.

The major trends there, he added, will be the continued conversion from metal to plastic bumpers and the expansion of the Fiero concept to other cars. The newer cars will have to be designed in 1986.

Most prominent in resins for engineering plastics will be blends of thermoplastic polyesters, nylons and polycarbonates.

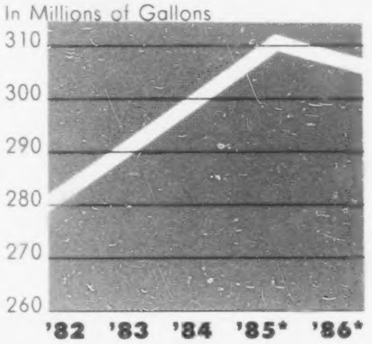
The Society of the Plastics Industry, New York, revises its annual statistics every September for the year before. Last year's revised figures put plastics shipments at 44 billion lbs, whereas it just fell short of 40 billion lbs in the earlier report. In 1984, it was 44 billion lbs. In 1983, it was 40.8 billion lbs.

For the first nine months of 1985, sales were running 6.3 pct ahead of 1984. It should end up at about 6 pct ahead of 1984. This year, look for another 5 pct gain.

Likewise, commodity plastics producers serving the industry's biggest markets—parts and packaging—look for a 4 to 5 pct gain in 1986.

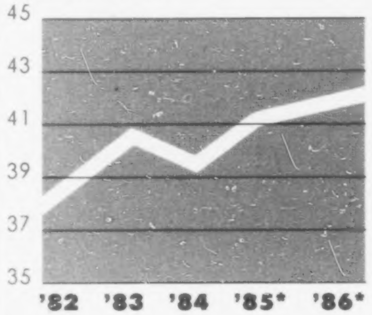
As Zincrometal body panels are phased out, coating companies plan to target other car parts for coating use.

Industrial Coatings Shipments
In Millions of Gallons



Source: U.S. Department of Commerce
*IA estimate

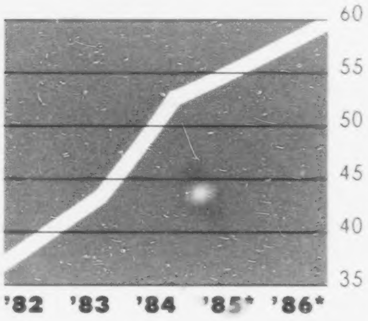
Plastic Resins Sales & Captive Use
In Billions of Lbs



Source: SPI Committee on Resin Statistics as complied by Ernest & Whinney
*IA estimate

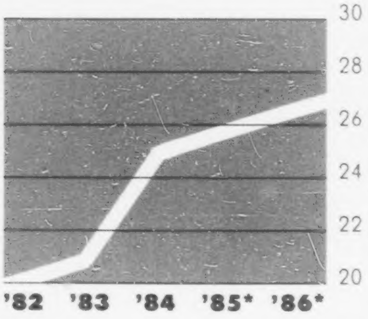
COMPUTERS; INSTRUMENTS & CONTROLS

In 1986, sales growth in the computer industry will be a modest 8 pct.



Computers Shipments
In Billions of Dollars

Source: U.S. Department of Commerce
*IA estimate



Instruments & Controls Shipments
In Billions of Dollars

Source: U.S. Department of Commerce
*IA estimate

COMPUTERS—In 1985, the computer industry stumbled for the first time. But the evidence is growing that it is beginning to right itself.

After three flat quarters, computer sales picked up during the last quarter of 1985.

Because of this last minute surge, industry growth for last year could be up 4 pct over 1984. In 1986, growth, in comparison to past years, will be a modest 8 pct.

But 1986 is a year hanging in the balance. On one hand, firms are growing convinced of the need to computerize to remain competitive. On the other hand, capital spending is on the decline—and 25 pct of capital spending goes for computers.

Faced with increased competition, firms may decide either to shop for a competitive edge or cut back to conserve capital. Either tactic will effect computer sales.

One reason for optimism about sales is that some long-awaited products are now available. Firms that have been waiting can now go shopping. New lines of superminicomputers, for example, are available as well as advanced workstations. Digital Equipment's new 8600 superminicomputer as well as its Microvax II workstation are selling well. And firms, waiting patiently for IBM's new Sierra series mainframes, can now put in their orders.

Last year, companies slowed their rush to buy computers and stepped back to consider how they could best be used. Integration rather than stockpiling became the goal.

The integration tools to link and network automation equipment may be inadequate, but developments are occurring daily. One of the most promising, Manufacturing Automation Protocol (MAP) being championed by GM and others, could help the industry convince its customers that it has more to sell.

INSTRUMENTS & CONTROLS—The outlook for 1986 for the process control industry at the end of 1985 indicates that the industry is on a slight uphill slope, with prospects for a flattening out or falloff in the last quarter of 1986. According to industry estimates, the slope ranges from 10 pct to 15 pct for some categories, which ain't bad in some circles.

This is a gut-reaction forecast because the industry is so broad that it is nearly impossible to focus on specifics. About 75 pct of sales of process control equipment in the U.S. goes to only four major industries. The largest percentage goes to the chemical industry, which buys about 26 pct; the petroleum industry, which buys 22 pct; public utilities, 17 pct; and primary metals, 13 pct.

Interestingly, one pie chart showing market share of process control equipment does not even mention manufacturing, though everyone knows that process controls are vital to many manufacturing processes.

Indicators of how the process control industry is faring include new plant and equipment expenditures, current and anticipated levels of real output, and the effect that emerging technologies have or could have on the industries served.

In recent years, process control equipment sales have increased at a greater rate than the Industrial Production Index. Although over 1,000 firms are members of the process control industry, the top ten suppliers account for nearly half of the industry's sales.

While the outlook continues to be favorable for most of 1986, the hottest markets at the end of 1985 are environmental controls and instruments to measure electricity. The latter's future progress is dependent on the semiconductor industry, which could prove troublesome.

CONSTRUCTION; FARM EQUIPMENT

CONSTRUCTION EQUIPMENT—The construction equipment industry will show another gain in 1986, industry sources believe. Shipments in 1985 rose about 6 pct, and 1986 should be up another 5 pct.

The numbers are modest, compared with some government data that showed a 40 pct gain in the first half of 1985. But the 1985 data covered equipment that wasn't included in previous reports. Excluding that change, the final figure of gain is pretty modest.

In actual units shipped, the industry did better than the dollar return would suggest. But prices were soft through both 1984 and 1985. And, one source pointed out, there was a deflation that pushed dollar totals below unit shipment gains.

The continuing inroads by imports have siphoned sales from domestic machinery builders. Imports hit $1.9 billion in 1985, a 15 pct market share. This is a climb from only $643 million in 1983.

The good side of the picture is that dealer inventories have been whittled down and observers of the dealer group report confidently that the average dealer is in a fairly lean position.

Equipment dealers in 1985 was selling about 3 pct more equipment per month than the prior year's period, according to the Associated Equipment Distributors Assn. That isn't that big a gain, but it's on top of an average monthly gain during 1984 of 22 pct per month.

The strong action in 1985 has been in highway and paving related equipment. The off-highway and heavier equipment showed some gains, but far less than the highway machinery. Light equipment has been helped by the continuing strong housing construction and this should continue at least through first half of this year.

FARM EQUIPMENT—For 1986, farm equipment builders are looking at another flat year, despite what appears to be a growing potential for equipment sales based on farm depreciation needs.

A negative change in depreciation rules by Congress would offset even that faint hope. Generally, world commodity prices remain low, competitive, and with little expectation of a change during 1986.

The flurry of activity in early 1985 in under-40 horsepower tractors roused hopes that the farm machine market would rebound. Unfortunately, this end of the market leans heavily on imports and has a low price ticket. Meantime, the heavy equipment like tractors and combines, continued to suffer.

As 1985 closed, producers of heavy equipment were cutting back on output. In the past, the end of the year has seen a sales flurry in either October or December.

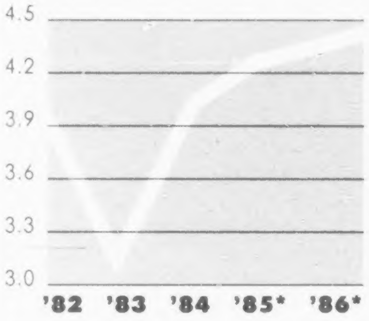
By October, combines were down nearly 30 pct, as were forage harvesters. Big tractors were off an aggregate 36 pct.

The pessimism has become deep enough that a few company officers can see further declines in 1986. It can be remembered though, that the farm machine forecasters had talked about a 5 pct decline in 1985. So even coming through flat with their 1985 performance, they did a few percentage points better than expected.

Farm equipment usually has its strongest product shipment period in the first and second quarters. For 1986, even that period won't show much gain. In strong years like 1979, the second half traditionally is slower. So there doesn't appear much relief in sight for 1986. Only the light industrial equipment divisions seem to show relatively good performance.

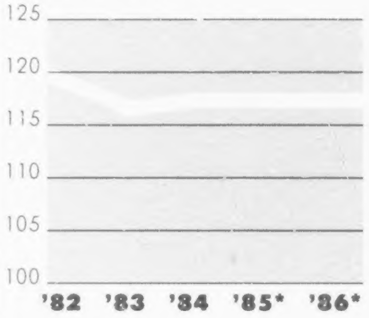
The construction equipment industry should be up another 5 pct in 1986.

Construction Equipment Shipments
In Billions of Dollars



Source: U.S. Department of Commerce
*IA estimate
Note: Figures for 1985 do not reflect Commerce Dept. additions to its list of selected products. IA estimates are projected on previous year's basis.

Farm Equipment Wheeled Tractor Sales
In Thousands of Units

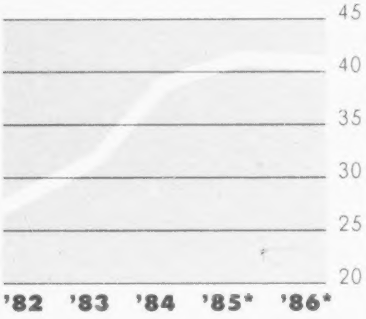


Source: Farm & Industrial Equipment Institute
*IA estimate

APPLIANCES; MATERIAL HANDLING

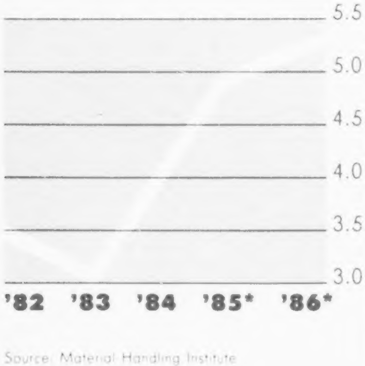
The appliance industry in 1986 is expected to equal or exceed the record pace of last year.

Appliances, Shipments
In Millions of Units



Source: Assn. of Home Appliance Manufacturers
*IA estimate

Material Handling Shipments
In Billions of Dollars



Source: Material Handling Institute
*IA estimate

APPLIANCES—It was a record-setting year for the appliance industry in 1985, with over 40 million appliances shipped.

From January through October, buyers seemed oblivious to economic forecasters' forecasts that blew hot and cold throughout the year. Each quarter set a new record. Industry shipments for the period exceeded 35.3 million units, which is also a 10-month record.

By November it appeared that industry shipments for 1985 will exceed 41.2 million units, a gain of 4.5 pct over 1984, the previous record year at 39.4 million units. Only 7.8 million units were needed to tie the record.

The outlook for 1986 is predicted by industry experts to equal or exceed this new record. Part of the basis for their expectations is that interest rates for home mortgages have remained relatively low, employment levels are acceptable, and the home market appears stable.

There are no traumatic events impending that would be expected to drastically change buying trends. Even the Congress seems to have taken a more cautious approach to changing the tax structure regarding interest deductions for first and second home mortgages.

One of the major appliance manufacturer's economic forecasters predicted that there would be some improvement in economic factors that would generate modest growth in the first half of 1986, but then interest rates were expected to gradually increase so that the second half would be a bit softer.

For 1986 it is expected that annual shipments will reach 40.5 million units, with 9.8 million units shipped during the first quarter.

Core appliance sales, which exclude microwave ovens and room air conditioners, may match '85 sales.

MATERIAL HANDLING—The material handling industry is expected to stay on course this year, meaning it will probably finish 1986 on par with 1985. But that's nothing to complain about.

One material handling executive says his firm's orders could increase between 5 and 11 pct this year.

Overall, U.S. markets for conveyors and conveying equipment, hoists, overhead cranes, monorails as well as automated storage and retrieval systems have been in a growth mode since the mid-1980s.

Latest figures for 1985 showed bookings and shipments running some 10 to 6 pct, respectively, over those of 1984.

Several industry members expect more of the same through the first quarter of 1986, though they have some doubts about the second half.

Because they are vulnerable to the cyclic swings of a free-market economy, several material handling equipment manufacturers said they were unhappy about recent reports that U.S. manufacturing firms planned to downgrade capital expenditures for this year.

That, coupled with the high consumer debt level and the fact that Congress can't make up its mind how to reduce the Federal budget deficit, has one Eastern materials handling executive concerned: "The general economy is in a state of limbo and that's not so hot for our business. Period."

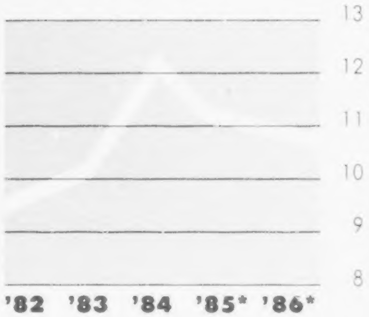
Nevertheless, depending on the markets served, order levels will range from flat to robust in 1986.

Manufacturers that serve the automotive or packaging segments see a lot of activity this year. Likewise, orders for automation-related material handling equipment, designed to feed parts for automated assembly operations, will likely continue on the upswing.

CASTINGS; FORGINGS

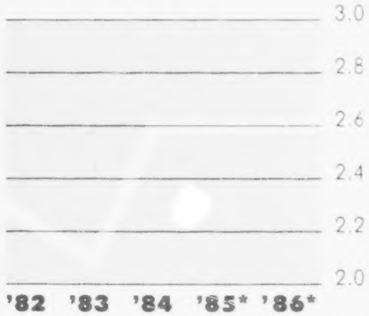
Foundrymen foresee a decline of 3 pct in 1986, with much of this in the automotive area.

Ferrous Castings Shipments
In Millions of Tons



Source: U.S. Department of Commerce and Iron Castings Society
*IA estimate

Impression Die Forgings Shipments
In Billions of Dollars



Source: Forging Industry Assn.
*IA estimate

CASTINGS—Many foundry executives believe 1986 will prove as difficult to predict as 1985.

Last year, an expected 5 pct gain turned into a 9 pct decline in tons of ferrous castings shipped. In 1986 the consensus anticipates a mild decline of 3 pct, with much of this in the automotive area.

Since auto is a big part of U.S. castings markets (about 35 pct by one estimate), a decline in that area has a major effect.

The moderate decline can be explained by the decision of several captive foundries to cut back production and bring in a greater proportion of offshore castings.

This will be supplemented by outsourcing more castings from domestic independent foundries. So a number of independent U.S. foundries will be able to run at least at 1985 levels through 1986. Some foresee an upturn as early as the first quarter.

Seasonally, March, April and May should be the heavy volume months of 1986. There is usually a mild seasonal recovery again in the September, October, November period. But for most of the industry, the second half of 1986 is still a question-mark.

One industry member, who sees 1986 running at 1985 levels with no drop off whatever, figures his firm will do the better part of its business in the second half.

So there's a lot of disagreement, but most agree on two matters. First, that total automotive castings use, whether from imports or domestic foundries, will decline in total tonnage. Captive foundries will be off somewhat more than independents. And second, that whatever the fate of auto sales in 1986, the import problem won't get better and may get worse, from the standpoint of the domestic foundry.

FORGINGS—The forging industry faced a rough 1985 and is expecting a slightly better 1986. The order increases, largely from the military and commercial aircraft manufacturers, will account for the growth.

Custom impression die shipments were expected to reach $2.6 billion in 1985, the same dollar volume for both 1984 and 1985. But orders are a different story. Bookings for 1985 likely will total $2.2 billion, a 15 pct drop from the previous year.

Orders this year are projected to climb to $2.5 billion. But even allowing this modest growth, forging activity for 1986 will be weak.

One reason for the lack of business is that forgers continue to be eaten alive by offshore competition. Figures from a year ago show that by conservative estimate some 40 pct of the 1984 consumption of ferrous forged products in the U.S. and Canada came from from abroad. And these totals worsened last year.

Another reason for poor sales is continuing depression of major markets. As farmer's woes deepen and imported equipment becomes more common, the farm equipment and off-highway markets continue to slump. Oil field sales remain depressed, while the use of forgings in metalworking and special machinery is not expected to pick up.

The automotive industry has been the big purchaser of forgings over the past year. Industry members hope that sales to the auto industry hold up through 1986. Rising imports and reduced consumer spending could dash that hope.

The best news for the new year is that commercial airlines seem to ready to start ordering new planes. Several forge shops report an increase in orders from the aircraft industry. In line with that activity, forge shops expect more orders from the defense industry this year.

AIRCRAFT; ENGINES & TURBINES

AIRCRAFT—The long-awaited surge in new aircraft orders finally took hold in the second half of 1985. There are indications it will continue right through 1986.

Several factors have turned industry executives strongly positive for the new year. Not the least of these is a continued increase in worldwide passenger traffic. Passenger traffic rose about 10 pct worldwide in 1985. Most officials predict an increase of 5 pct in 1986.

Such growth translates into increased operating revenue (up 6.3 pct worldwide last year) and profitability for major airlines.

Softer fuel prices coupled with employee concessions won by several U.S. carriers in 1985 are also helping their bottom lines.

This, in turn, transfers into good tidings for the aircraft manufacturers. They know airline fleets are aging and there is a need for replacement aircraft. When will the airlines be able to afford new airplanes? The answer appears to be: Late 1985 and all of 1986.

American Airlines, United and Northwest as well as regional carriers like Texas Air and Western have jumped into the market in the past 14 months. Other carriers are poised to place new orders, although it is unclear when these will be finalized. Final 1985 sales and delivery figures will be well above those of the last several years—and 1986 should be even better.

Meanwhile, airframe manufacturers are moving to enter the market with derivative, down-sized versions of existing planes.

However, industry officials caution that market conditions among the three major manufacturers remain competitive, which results in discounting, unique financing arrangements and other special deals, such as used aircraft returns.

ENGINES & TURBINES—The new year will mark the continuation of a long-term trend that has affected this industry for several years: Flat demand. Analysts and industry executives see no quick end to the difficulties that plague this market.

At the heart of this industry's problems is sliding demand from industrial and commercial users of electrical power. This has resulted in a halt to construction of new power plants, and a dearth of orders for giant turbine generator sets and steam supply systems.

The overcapacity extends to overseas markets, where U.S. manufacturers are hard-pressed to make inroads because of the strong dollar and aggressive foreign competitors.

The generally high generating reserve experienced by the utility companies should not reverse itself in 1986. The nuclear power industry's woes are a further drag on this segment of the market.

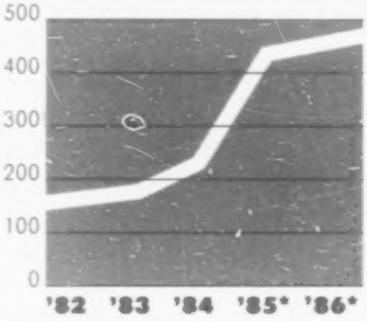
The oil segment of the industry continues to suffer from soft demand. Imports are impacting the hydropower end of the industry.

However, there are a few potential bright spots. The general economic pickup has aided diesel engine makers and the outlook for construction equipment. On the energy side, slowly increasing demand for energy efficient co-generation facilities eventually will aid those manufacturers. This segment has begun to grow and is helping large manufacturers like Westinghouse and General Electric. But sustained growth is still a few years away.

Aircraft engine sales are another bright spot for 1986. The upturn in commercial air traffic that began in 1984 is asserting itself in new airplane orders and engine sales. As overcapacity evaporates and new technology products are introduced, engine sales are likely to increase.

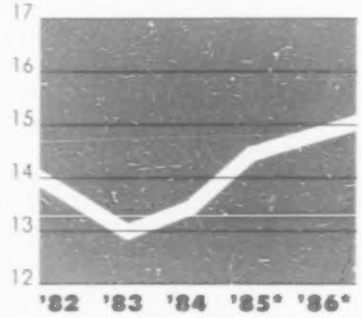
The long-awaited surge in new aircraft orders will continue right through 1986.

Commercial Airplane Orders
No. of Planes



Source: Airbus Industrie, Boeing and McDonnell-Douglas
*IA estimate

Engines and Turbines Shipments
In Billions of Dollars

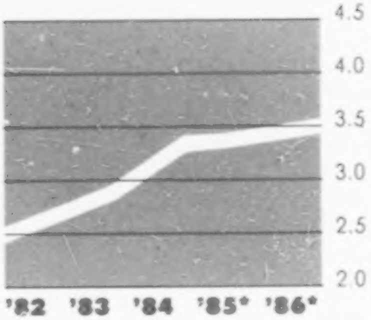


Source: U.S. Department of Commerce
*IA estimate

WELDING; HEAT TREATMENT

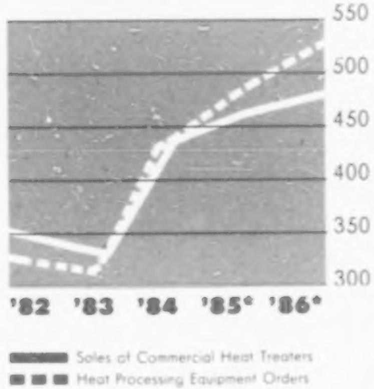
Some welding executives see 1986 as a long, dry year for their industry.

Welding Shipments
In Billions of Dollars



*IA estimate

Heat Treatment
In Millions of Dollars



Source: Industrial Heating Equipment Assn., Metal Treating Institute

*IA estimate

WELDING—During the first eight months of 1985, overall sales of filler metals were down more than 4 pct in dollars and about $6^{1}/_{2}$ pct in lbs from 1984. Excluding gases, cutting and resistance welding, equipment (which represents about 40 pct of the total market) was up 3 pct.

Some executives see 1986 as being a long, dry year for welding. No particular improvement is expected.

There will be a few bright spots, however. They will be robots and automation. Robotic spot welding, as used in what has been a healthy automotive industry, should enjoy a very good year.

Improvements are also seen in building construction, bridge repair, aerospace and defense.

On the other side of the ledger, the weak markets include the following long list: Barges, railcars, heavy fabrication, pipelines, off-highway equipment, farm equipment, power plants, chemical plants and refineries.

One major manufacturer described 1985 as a good year and said 1986 should be an incremental improvement over last year.

There's an emergence of small fabricators all over the country. Many of these companies have been formed within the last two years.

To some extent, this element seems to be replenishing the traditional large welding users which have shrunk considerably over the past few years.

Imports still only represent about 9 pct of the U.S. market, but most of this volume is sold through welding distributors. That is one reason why the statistics released through the National Welding Supply Association (NWSA), Philadelphia, appear to be very healthy. Still, the NWSA figures were the best ever in 1985, and more of the same seems imminent in 1986.

HEAT TREATMENT—A star performer in the 1986 capital goods market may well be industrial heating equipment.

Always volatile, it nonetheless managed an 11 pct gain in 1985, after a 34 pct gain in 1984. It scored the hard way, with an up-and-down year that ranged from a 21 pct gain in the first quarter that plunged 22 pct in the second quarter.

And just about the time a downward revision was cranked into the computers, the third quarter zoomed up by 44 pct over the previous period. The fourth quarter was a little more moderate, up possibly 10 pct.

What may prove significant, however, was a late breaking gain in both orders and inquiries. There were inklings of this as early as July, but the trend continued into December, some producers report. Automotive is one factor the optimists are looking at with hope. So are aerospace, defense and electronics.

By contrast, the industrial heat treat plants are considerably more cautious. That is weighted heavily by concern in the Midwest over important markets like trucks, construction machinery and farm equipment. It also reflects the conservative forecasts coming from the foundry industry.

Heat treaters probably finished 1985 with a dollar gain of about 6 pct. Shops in the Midwest were down while the West and East were up. So when they look at 1986, heat treaters are talking of not more than 3 pct, and in the Midwest of declines of perhaps 5 pct.

The difference in the regions is impressive. Some plants in the East and South were running seven days a week into December, which is a pretty strong rate for that period. The West Coast, helped by aerospace, defense and electronics, was also performing well.

FASTENERS;
SCREW MACHINE PRODUCTS

FASTENERS—Fasteners fall into two major categories, "standards" and "specials." Standard products are high volume, low unit cost items and the dwindling number of domestic companies that make these items face a stiff competition from their overseas rivals.

By contrast, sales of special fasteners, products built to particular specifications, appear to be holding up. Their success, and the higher value price tag they carry, offset the dwindling sales of the domestic makers of standard fasteners.

According to the U.S. Commerce Department, sales last year totaled \$4.1 billion, up slightly from \$3.9 billion in 1984. Commerce officials estimate 1986 sales will duplicate 1985 totals.

What slight success the industrial fastener industry had during 1985 can be attributed largely to the automotive industry. Cars and trucks account for an estimated one-third of fastener sales (by dollar value).

Fastener makers that depend on Detroit could see their sales stall this year.

A surge of foreign car buying began during the last quarter of 1985 and should continue into 1986. Also, Japanese carmakers plan to export 25 pct more vehicles to the U.S. this year.

If the largest market for fasteners is faltering, another major market is picking up steam. Commercial aircraft production, after several years of dormancy, has begun to take off. Several major carriers have placed major orders for new aircraft and more are expected to follow.

Another major user of fasteners is the industrial machinery industry. However, with evidence mounting that firms are cutting back on capital equipment expenditures, sales to this market should drop off, at least through the first half of 1986.

SCREW MACHINE PRODUCTS—Like many industries, the screw machine products industry anticipated a good year in 1985. And with good cause for optimism.

Shipments, which had been flat during 1982 and 1983 recession period at the \$2.4 billion level, rose during 1984 as business activity increased. Early estimates predicting \$2.8 billion in shipments in 1984 proved correct.

The business climate since 1984 has continued at about the \$2.8—\$2.9 billion level and is expected to remain there during the first half of 1986. The last half of 1986 is expected to soften somewhat, for no other reason than the fact that no one sees any positive programs or industry changes that would improve sales significantly.

Industry specialists report that actual shipments during 1985 are dropping off as the year ends and that when the Department of Commerce final figures are reported about two years hence the falloff may be as much as 3 pct.

Predictions about future shipments in 1986 range from the same (flat) to a decline of as much as 6 pct from 1985's shipments.

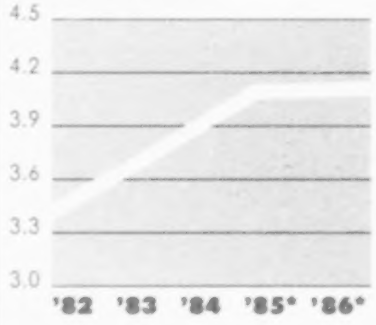
The industry apparently is holding its own regarding numbers of businesses engaged in producing screw machine products.

There are between 1,700 and 1,800 large and small firms involved, not including captive shops.

The shops are usually located close to customer plants so that it is almost an extension of some customer's engineering and production lines. Where it has involved mass production, with long runs, and is capital intensive with low labor content, some shops are now being confronted with the need for shorter runs of a wider variety of parts for faster deliveries.

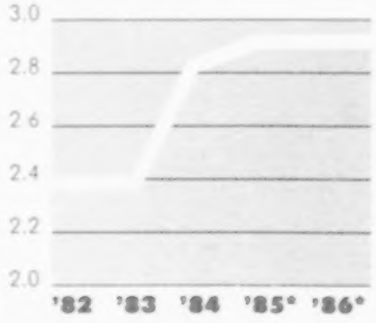
Fastener makers that depend on Detroit could see their sales stall this year.

Fasteners, Sales
In Billions of Dollars



Source: Industrial Fasteners Institute
*IA estimate

Screw Machine Products Shipments
In Billions of Dollars

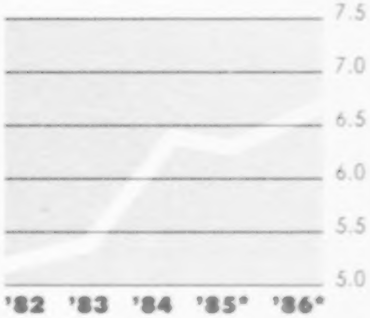


Source: U.S. Department of Commerce
*IA estimate

STAMPINGS; GEARS

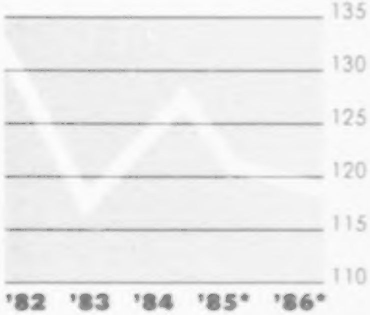
Stamping executives don't expect much change in either production or demand in 1986.

Stampings Shipments
In Millions of Dollars



Based on the average of a control group whose shipments total more than $500 million annually.
Source: American Metal Stamping Assn.
*IA estimate

Gears Bookings



Based on average monthly bookings. 1977 = 100.
Source: American Gear Manufacturers Assn.
*IA estimate

STAMPINGS—Stamping industry executives see their markets moving a little ahead of 1985 in 1986. Most characterized last year as 'moderately good' for their industry.

Some stamping executives don't expect much change in either production or demand in 1986 from 1985. An automotive industry supplier believes his 1986 business will be strong, with no difference in percentage from last year.

Much of the past two years' momentum in stamping orders was provided by the auto industry. Auto sales are likely to decelerate in 1986, several stamping executives say, but not enough to make a big dent in their orders.

One industry spokesman says he expects the auto market to remain strong for much of the first half, in part because of the auto industry's sales incentive plans.

Although the automakers are using more injection molded plastic, stamping executives say these materials will have little effect on their sales this year and for the next five years.

Record appliance sales last year also helped the stamping industry. Most expect this market to hold up well through the year.

One sour note: Housing starts, which heavily influence appliance sales, have been off for the past three months. This will catch up to appliance sales by the second half, but the replacement market isn't expected to slip.

Stampers also see more softening in the office machines and computer segments, noting sizeable worker layoffs, but they are optimistic this won't hit their orders this year.

Because of that slippage one stamper said he's picking up more business from the medical and surgical equipment makers to balance out his order books.

GEARS—Gear industry executives see more "blahs" than "hurrahs" from 1986—no recession, but little, if any, real growth.

One Midwestern gear manufacturer summed it up this way, "Even if the dollar weakens more and interest rates drop, I think 1986 will be a tougher row to hoe than 1985."

In lagging the general economy by six to nine months, gearmakers won't really feel the second-half 1985 slowdown until the first quarter of this year. Or later.

One gear manufacturer predicts his 1986 sales could rise 2 or 3 pct ahead of last year; another said he would be lucky "if he didn't go down."

An anticipated bland 1986 isn't hard to explain.

However, one driving force behind precision and commercial-type gears has been car sales. Although inflated by incentives last year, auto sales are not expected to tail off sharply this year, so gear suppliers are looking forward to more of the same here. There have been recent reports of a slump in defense contracts. Orders may bounce back, but gearmakers fear the push to reduce the deficit will undoubtedly cut more from the military budget.

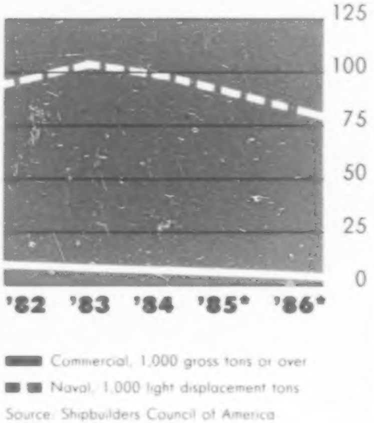
Of the capital goods markets, the pulp and paper and water and wastewater treatment sectors are reported to be the only active markets, so gear manufacturers don't envision a pickup in orders for their 'big stuff.'

On the other hand, they do contemplate some solid contracts for updating, parts or repair work from the capital goods sector.

Gear's big bogeyman—imports—will continue to harass the industry through 1986, despite the devalued U.S. dollar. As for exports, one gear industry official concluded, "What they (foreigners) do well we let in—what we do well, they won't let in."

SHIPBUILDING; RAILCARS

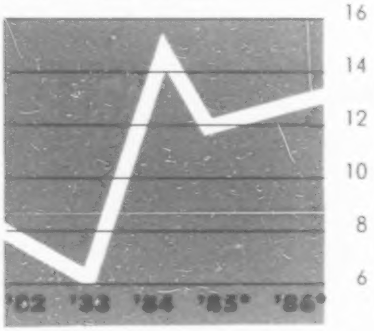
The only strength in the shipbuilding industry is in Naval ship construction.



Shipbuilding
No. of vessels

Source: Shipbuilders Council of America

*IA estimate



Rail Car Orders
In Thousands of Units

Source: American Railway Car Institute

*IA estimate

SHIPBUILDING—Commercial shipbuilding continues its downward trend. Only 100,000 gross tons of large ships will be constructed next year. By comparison, the 1985 and 1984 figures were 230,000 and 240,000 gross tons, respectively.

The only strength in the industry is in Naval ship construction, but even that once booming activity is beginning to dwindle.

The number of vessels under construction and/or on order has gone from 93 to 105 to 100 to 83 in the past four years. Next year the number of ships under construction is expected to drop to 78.

"The boom years of the Reagan Administration are a thing of the past," noted one shipbuilding executive. "It looks like we will be moving into construction years like we had during the Carter Administration."

Actually, it's not all that bad. New orders in 1977, for example, stood at 15 and they will be expected to reach 21 in 1986.

This year appears to be an 86 vessel year. Possible new orders in fiscal year 1986 number about 21 new vessels, but the expected delivery of 26 vessels will bring the total number of ships under construction or on order down to 81.

Ship overhaul work continues at a steady pace with Newport News Shipbuilding being the latest beneficiary. It received a $205 million Navy contract for overhaul planning for the nuclear aircraft carrier Dwight D. Eisenhower.

Offshore rig construction is showing little sign of improvement. In 1981, for example, 219 rigs were under construction throughout the world, 66 of them in the U.S. In 1984, as many as 50 offshore drilling rigs were being built worldwide, but only three in the U.S.

RAILCARS—The railcar construction industry has just closed out a 12,000 to 13,000 year, a far cry from the late 1970s when the industry's annual orders totaled 100,000 or more cars.

According to the Association of American Railroads (AAR) in Washington, D.C., orders for new freight cars last October totaled 980, compared with only 153 in September and 1,578 in October 1984. Cars placed in service last October totaled 1,169, compared with 1,020 in September and 1,295 in October.

As of Nov. 1, 1985, the backlog of cars on order but undelivered was 2,394, compared with 2,583 on Oct. 1, and 5,899 on Nov. 1, 1984.

As of Nov. 1, the average monthly backlog was 3,755, compared with 6,350 the previous year.

Meanwhile, the AAR reported that 69 new locomotives were placed in service last October, compared with 75 in September and 35 in October 1984.

The railroads are just not buying equipment and there is still surplus out there. There will be some purchases next year, industry members say, but they won't be much more than this year, maybe 12,000 to 13,000 cars.

Of the 80,000 cars ordered over the past five years, the railroads have purchased less than 5 pct of them. Private car companies and leasing companies bought the rest.

Next year doesn't look like it will be much better, either. A 13,000 car year is about what can be expected.

As one industry spokesman phrased it: "Somewhere along the line, something has to break. Everybody is working on innovations to make railcars more efficient."

Carbuilders and component manufacturers are both into this kind of activity. An example is the high-productivity integral train.

ANNUAL REVIEW OF METAL PRICES AND PRODUCTION

INDEX

STEEL PRODUCTION

World Steel Production 59
U.S. Yearly Steel Production 59
U.S. Monthly Steel Production 60
U.S. Capability Utilization 60

STEEL PRICES

Composite Prices by Periods 60
Composite Prices by Months 60
Galvanized Sheets 64
Hot-Rolled Sheets 64
Cold-Rolled Sheets 64
Structural Steel Shapes 64
Special Quality Bars 64
Steel Plates 64
Tinplate 66
Hot-Rolled Strip 66

IRON

Pig Iron Production 64
U.S. Iron Ore Supply 64

STEEL SCRAP

IRON AGE Composites 66
Chicago 67
Pittsburgh 67
Philadelphia 67

NONFERROUS PRICES

Aluminum Ingot 68
Electrolytic Copper 68
Lead 69
Zinc 69
Straits Tin 73
Electrolytic Nickel 73

NONFERROUS PRODUCTION

Primary Aluminum 74
Refined Copper 74
Slab Zinc 74
Refined Lead 74

World Steel Production

Raw steel, thousands of metric tons

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985*
Argentina	2,208	2,410	2,684	2,786	3,199	2,687	2,541	2,900	2,900	2,600	2,800
Australia	7,869	7,794	7,338	7,596	8,119	7,589	7,635	6,400	5,600	6,200	6,300
Austria	4,069	4,476	4,093	4,335	4,917	4,623	4,656	4,300	4,400	4,900	4,600
Belgium	11,582	12,145	11,256	12,601	13,442	12,322	12,283	10,000	10,200	11,300	10,700
Brazil	8,387	9,253	11,253	12,205	13,893	15,309	13,213	13,000	14,700	18,400	20,200
Bulgaria	2,265	2,460	2,589	2,469	2,482	2,567	2,483	2,600	2,800	2,800	2,500
Canada	13,025	13,290	13,631	14,899	16,054	15,901	14,811	11,900	12,800	14,700	14,500
China	23,903	20,459	23,740	31,780	34,484	37,121	35,600	37,100	40,000	43,400	45,600
Czechoslovakia	14,324	14,693	15,054	15,294	14,817	14,925	14,270	15,000	15,000	15,500	15,300
France	21,531	23,227	22,094	22,844	23,360	23,176	21,261	18,400	17,600	19,000	19,000
West Germany	40,412	42,413	38,984	41,253	46,040	43,838	41,610	35,900	35,700	39,400	41,200
East Germany	6,480	6,740	6,850	6,976	7,024	7,308	7,467	7,200	7,200	7,500	7,500
Hungary	3,671	3,652	3,723	3,773	3,907	3,767	3,645	3,700	3,600	3,800	3,800
India	7,791	9,364	10,009	10,099	10,126	9,514	10,780	11,000	10,200	10,500	10,900
Italy	21,865	23,455	23,335	24,283	24,250	25,501	24,777	24,000	21,800	24,000	23,900
Japan	102,313	107,399	102,405	102,105	111,748	111,395	101,676	99,500	97,200	105,600	105,900
North Korea	2,900	3,000	4,000	5,080	5,400	5,800	5,500	5,800	6,100	6,500	6,500
South Korea	1,994	3,515	4,347	4,969	7,610	8,558	10,753	11,800	11,900	13,000	13,400
Luxembourg	4,624	4,565	4,329	4,790	4,949	4,618	3,791	3,500	3,300	4,000	4,000
Mexico	5,272	5,298	5,601	6,711	7,005	7,099	7,605	7,100	6,900	7,500	6,900
The Netherlands	4,817	5,178	4,923	5,583	5,806	5,264	5,464	4,400	4,500	5,700	5,500
Poland	15,007	15,640	17,841	19,251	19,218	19,485	15,719	14,800	16,200	16,600	16,000
Rumania	9,549	10,970	11,457	11,780	12,909	13,175	13,025	13,100	12,600	14,300	14,000
South Africa	6,831	7,106	7,295	7,902	8,876	9,068	9,004	8,200	7,000	7,700	8,000
Spain	11,102	10,982	11,169	11,339	12,248	12,672	12,919	13,200	13,000	13,500	14,000
Sweden	5,611	5,139	3,968	4,327	4,700	4,237	3,770	3,900	4,200	4,700	4,800
United Kingdom	19,773	22,396	20,467	20,367	21,523	11,342	15,573	12,700	15,000	15,100	15,700
U.S.S.R.	141,325	144,805	146,655	151,400	149,087	147,931	148,517	147,200	152,500	154,300	154,000
United States	105,816	116,120	114,700	124,002	123,276	101,696	108,782	67,600	76,800	83,900	79,000
Yugoslavia	2,916	2,751	3,182	3,456	3,535	3,634	2,977	3,800	4,100	4,200	4,600
Others	13,548	14,970	17,672	21,061	24,612	25,748	22,749	24,300	13,600	15,100	15,100
Total	642,980	675,511	675,635	717,159	746,448	716,018	706,856	645,200	663,200	709,900	695,700

*Estimates. Source: International Iron and Steel Institute.

U.S. Yearly Raw Steel Production*

Net Tons

	Openhearth		Basic Oxygen Process		Bessemer**		Electric‡		
	Production	Percent of Total Output	Production	Percent of Total Output	Product	Percent of Total Output	Production	Percent of Total Output	Total Production
1954	80,327,494	91.0			2,584,104	2.9	5,436,054	6.1	88,311,652
1955	105,359,417	90.0	307,279		3,319,517	2.8	8,049,872	7.2	117,036,085
1956	102,840,585	89.2	506,338		3,227,997	2.8	8,641,229	8.0	115,216,149
1957	101,657,776	90.2	611,508		2,475,138	2.2	7,970,574	7.6	112,714,996
1958	75,879,394	89.0	1,323,361	1.5	1,395,985	1.6	6,656,145	7.9	85,254,885
1959	81,668,997	87.3	1,864,338	2.0	1,380,283	1.5	8,532,514	9.2	93,446,132
1960	96,367,506	87.0	3,346,150	3.3	1,189,196	1.5	8,378,743	9.2	99,281,601
1961	84,502,071	86.2	3,967,158	4.0	881,060	0.89	8,664,203	8.9	98,014,492
1962	82,957,318	84.8	5,552,697	5.2	804,964	0.8	9,012,806	9.2	98,327,785
1963	88,833,925	81.3	8,544,078	7.8	962,659	0.9	10,920,287	10.0	109,260,949
1964	98,097,499	77.2	15,442,186	12.2	857,586	0.6	12,678,496	10.0	127,075,767
1965	94,193,225	71.7	22,878,605	17.4	585,965	0.4	13,803,806	10.5	131,461,601
1966	85,024,572	63.4	33,928,374	25.4	278,119	0.2	14,870,363	11.0	134,101,428
1967	70,690,028	55.6	41,434,350	32.5	**	**	15,088,545	11.9	127,212,923
1968	65,836,000	50.1	48,812,000	37.2	**	**	16,814,000	12.7	131,462,000
1969	60,894,041	43.1	60,235,071	42.7	**	**	20,131,950	14.2	141,261,062
1970	48,022,000	36.6	63,330,000	48.2	**	**	20,162,000	15.2	131,514,000
1971	35,559,000	29.5	63,943,000	53.1	**	**	20,941,000	17.4	120,443,000
1972	34,936,000	26.2	74,584,000	56.0	**	**	23,721,000	17.8	133,241,000
1973	39,780,000	26.4	83,260,000	55.2	**	**	27,759,000	18.4	150,799,000
1974	35,499,000	24.3	81,552,000	56.0	**	**	28,669,000	19.7	145,720,000
1975	22,161,000	19.1	71,801,000	61.5	**	**	22,680,000	19.4	116,642,000
1976	23,470,000	18.3	79,918,000	62.4	**	**	24,612,000	19.3	128,000,000
1977	20,043,000	16.0	77,408,000	61.8			27,882,000	22.2	125,333,000
1978	21,310,000	15.5	83,484,000	61.0			32,287,000	23.5	137,031,000
1979	19,158,000	14.0	83,256,000	61.0			33,927,000	23.0	136,341,000
1980	13,054,000	11.7	67,615,000	60.4			31,166,000	27.9	111,835,000
1981	13,452,000	11.1	73,231,000	60.6			34,145,000	28.3	120,828,000
1982	6,110,000	8.2	45,309,000	60.7			23,158,000	31.1	74,577,000
1983	5,951,000	7.0	52,050,000	61.5			26,615,000	31.5	84,615,000
1984	8,336,000	9.0	52,822,000	57.1			31,369,000	33.9	91,131,000
1985‡‡	7,820,000	9.0	49,680,000	57.0			29,500,000	34.0	87,000,000

*Steel in first solid state after melting suitable for further processing or sale, including ingots, steel castings and strand or pressure cast blooms, billets, slabs, or other product forms. **Included in openhearth since 1966. ‡ Includes small tonnages of crucible steel.
‡‡ IRON AGE estimate.

Source: AISI

U.S. Monthly Raw Steel Production, Net Tons

	1960	1961	1962	1963	1964	1965	1966
Jan	12,049,404	6,416,004	10,352,748	8,390,914	9,526,000	11,830,469	10,577,000
Feb	11,126,806	6,239,098	9,698,316	8,222,352	9,485,359	10,865,869	10,249,000
Mar	11,564,683	7,086,389	10,583,943	10,080,014	10,496,987	12,346,963	12,083,000
Apr	9,777,857	7,584,687	9,235,881	10,695,362	10,560,651	11,966,162	11,570,000
May	8,830,472	8,980,626	7,535,506	11,489,524	11,060,357	12,012,449	12,191,000
June	7,404,873	8,551,856	6,691,785	10,365,154	10,184,634	11,593,450	11,403,000
July	6,350,924	8,091,956	6,174,187	8,653,544	10,105,609	11,550,988	10,791,000
Aug	6,838,000	8,660,527	7,097,916	7,781,560	10,515,268	11,324,149	11,097,000
Sept	6,458,421	8,904,000	7,251,023	7,858,009	10,668,978	9,949,355	11,280,000
Oct	6,868,380	9,173,170	7,780,538	8,483,160	11,568,248	9,295,828	11,509,000
Nov	6,171,940	8,745,966	7,846,057	8,488,239	11,292,070	8,822,186	10,887,000
Dec	5,839,841	9,568,954	8,079,885	8,753,117	11,611,606	9,627,156	10,435,000
Total	99,281,601	96,014,497	98,327,785	109,260,949	127,075,767	131,461,601	134,101,000

	1967	1968	1969	1970	1971	1972
Jan	10,633,000	12,014,599	11,083,447	11,247,855	11,273,740	10,001,028
Feb	10,041,000	11,794,896	10,915,021	10,498,356	10,874,377	9,979,752
Mar	10,963,000	12,721,053	12,400,375	11,885,581	12,645,241	11,587,946
Apr	10,349,000	12,450,040	12,142,751	11,385,675	12,564,686	11,587,946
May	10,577,000	12,700,325	12,356,384	11,574,485	12,920,414	11,936,558
June	9,576,000	11,905,936	11,810,287	11,323,096	11,490,602	10,979,970
July	9,620,000	11,452,380	11,365,146	10,780,960	9,942,264	10,341,230
Aug	10,300,000	8,955,712	11,420,995	10,764,738	5,773,736	10,842,279
Sept	10,438,000	8,085,770	11,523,106	10,726,618	7,678,110	10,912,540
Oct	11,171,000	9,006,237	12,323,544	10,698,720	8,211,000	11,656,841
Nov	11,299,000	9,590,000	11,916,305	10,008,000	8,053,140	11,398,316
Dec	11,953,000	10,471,000	11,812,097	10,438,000	8,783,805	11,878,199
Total	127,213,000	131,462,000	141,261,662	131,514,000	120,442,526	133,241,105

	1973	1974	1975	1976	1977	1978	1979
Jan	12,372,882	12,726,000	11,584,190	9,834,725	9,089,254	10,301,277	11,104,826
Feb	11,625,734	11,598,000	10,861,663	9,906,523	8,858,896	9,643,242	10,562,363
Mar	13,088,378	12,758,000	11,980,244	11,294,279	11,049,226	11,082,593	12,575,987
Apr	12,788,629	12,442,000	10,667,492	11,439,185	11,166,557	11,528,357	12,195,612
May	13,174,066	12,752,000	9,863,557	12,136,009	12,200,852	12,320,398	12,788,673
June	12,487,656	12,185,000	8,743,842	11,604,506	11,383,812	11,860,523	12,229,996
July	12,290,250	12,155,000	8,370,426	11,399,954	10,319,277	11,387,671	11,821,349
Aug	12,181,330	11,837,000	8,648,260	11,128,102	10,392,460	11,549,515	11,309,493
Sept	12,229,008	11,849,000	9,295,321	10,462,577	10,050,311	11,467,224	10,541,320
Oct	12,875,791	12,617,045	9,213,736	10,278,000	10,442,000	12,105,000	10,809,966
Nov	12,586,509	11,614,000	8,709,090	9,494,000	9,748,000	11,654,000	9,997,000
Dec	12,721,577	10,960,000	8,845,511	9,215,000	10,031,000	11,812,000	9,996,000
I4							
Total	150,798,927	145,720,000	116,783,332	128,000,000	125,333,000	137,031,000	136,341,000

	1980	1981	1982	1983	1984	1985
Jan	10,700,736	10,590,135	7,737,389	5,570,000	7,970,000	6,984,000
Feb	10,331,868	10,028,344	7,177,979	5,676,000	8,142,000	6,851,000
Mar	11,438,944	11,744,370	8,048,621	7,127,000	9,056,000	8,269,000
Apr	10,658,207	11,242,726	7,005,717	7,292,000	8,997,000	7,872,000
May	9,225,991	11,422,988	6,678,457	7,412,000	9,174,000	7,830,000
June	7,500,772	10,451,364	6,050,062	6,993,000	7,945,000	7,292,000
July	6,795,726	10,159,544	5,718,617	6,921,000	7,460,000	7,010,000
Aug	7,018,547	10,120,254	5,537,970	7,020,000	6,915,000	7,130,000
Sept	7,766,905	9,618,072	5,298,622	7,134,000	6,378,000	6,924,000
Oct	9,442,153	9,002,756	5,262,370	7,692,000	6,703,000	7,351,000*
Nov	10,057,000	7,962,000	4,546,000	7,263,000	6,422,000	6,987,000*
Dec	10,180,000	7,671,000	4,456,000	6,991,000	6,013,000	6,500,000*
I4						
Total	111,835,000	120,828,000	74,577,000	84,615,000	92,528,000	87,000,000*

*Estimate

Source: AISI

Steel in first solid state after melting suitable for further processing or sale, including ingots, steel castings and continuous or pressure cast blooms, billets, slabs, or other product forms.

U.S. Raw Steel Production, Rate of Capability Utilization

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Jan	98.4	111.2	102.6	104.1	104.3	92.6	114.5	117.8	90.4	74.4
Feb	102.9	116.7	111.8	107.6	111.4	98.7	119.1	118.8	90.8	80.1
Mar	101.5	117.7	114.8	110.0	117.0	107.3	121.1	118.1	93.4	85.4
Apr	99.0	119.1	116.1	108.9	120.2	110.8	122.3	119.0	84.9	88.4
May	97.9	117.5	114.4	107.1	119.6	110.5	121.9	118.0	75.9	90.6
June	91.6	113.9	113.0	108.3	109.9	105.0	119.4	116.5	69.6	89.7
July	89.0	106.0	105.2	99.8	92.0	95.7	113.8	112.5	65.1	84.8
Aug	95.3	82.9	105.7	99.6	53.4	100.4	112.7	109.6	67.3	82.8
Sept	99.8	77.3	110.2	102.6	73.4	104.4	117.0	113.3	74.7	80.4
Oct	103.4	83.4	114.1	99.9	76.0	107.9	119.2	110.8	69.0	75.8
Nov	108.1	91.7	114.0	95.7	77.0	109.0	120.4	111.1	67.4	72.2
Dec	110.6	96.5	109.3	96.6	81.3	109.9	117.7	101.4	66.2	67.8
Average	100.0	103.1	111.0	103.4	94.7	104.5	116.5	114.5	76.2	80.9

	1977	1978	1979	1980	1910	1982	1983	1984	1985
Jan	66.8	77.2	83.5	82.7	79.9	59.3	43.4	69.6	60.9
Feb	72.1	80.1	87.9	85.3	83.7	60.9	49.0	76.0	66.1
Mar	81.2	83.1	94.5	88.4	88.6	61.7	55.5	79.1	72.1
Apr	83.3	88.5	93.4	83.0	87.7	55.2	58.9	80.8	71.6
May	88.1	91.5	94.8	69.6	86.2	50.9	57.9	79.8	68.9
June	84.9	91.1	93.7	58.4	81.5	47.4	56.5	71.4	66.3
July	76.7	85.1	89.9	53.1	77.6	43.8	54.3	65.3	62.1
Aug	77.2	86.3	86.0	54.8	77.3	42.4	55.1	60.5	63.2
Sept	77.2	88.6	82.8	62.7	75.9	41.9	57.8	57.7	63.4
Oct	77.7	88.1	84.4	72.2	68.7	40.2	50.2	49.7	65.2*
Nov	75.0	89.4	80.6	79.5	62.8	35.9	58.7	48.4	59.0*
Dec	74.7	87.7	78.0	77.8	58.6	34.0	54.7	45.1	58.0*
Average	78.4	86.8	87.8	72.8	78.3	48.4	56.2	65.3	64.7*

*Estimate

Rate of Capability Utilization, begun January, 1976, revised back to January, 1975.

Source: AISI

STEEL PRICES

Composite Prices by Periods

Period	Cents per Pound
April 17, 1978 to July 31, 1978	17.670
July 31, 1978 to Dec. 31, 1978	18.719
Jan. 1, 1979 to April 1, 1979	19.549
April 1, 1979 to May 13, 1979	19.606
May 13, 1979 to July 1, 1979	19.668
July 1, 1979 to July 9, 1979	20.095
July 9, 1979 to Oct. 1, 1979	20.311
Oct. 1, 1979 to Jan. 6, 1980	20.547
Jan 7, 1980 to Mar. 1, 1980	21.038
Mar. 2, 1980 to Mar. 9, 1980	21.130
Mar 10, 1980 to Mar. 31, 1980	21.180
Apr. 1, 1980 to July 6, 1980	21.739
July 7, 1980 to Oct. 4, 1980	21.736
Oct. 5, 1980 to Nov. 30, 1980	22.019
Dec. 1, 1980 to Dec. 31, 1980	22.286
Jan. 1, 1981 to Feb. 1, 1981	22.901
Feb. 2, 1981 to Feb. 28, 1981	23.362
Mar. 1, 1981 to Mar. 28, 1981	23.598
Mar. 29, 1981 to June 20, 1981	23.776
June 21, 1981 to Sept. 26, 1981	24.488
Sept. 27, 1981 to April 3, 1982	25.195
April 4, 1982 to Feb. 5, 1983	25.297
Feb. 6, 1983 to Feb. 13, 1983	25.954
Feb. 14, 1983 to Aug. 31, 1983	26.217
Sept. 1, 1983 to Feb. 12, 1984	26.822
Feb. 13, 1984 to May 13, 1984	26.939
May 14, 1984 to June 30, 1984	27.405
July 1, 1984 to Dec. 31, 1985	27.582

The Iron Age Finished Steel Composite Price

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
January	6.368	6.445	6.545	6.794	7.263	7.808	9.014	9.363	9.456	12.739
February	6.388	6.448	6.545	6.904	7.351	7.808	8.998	9.363	9.480	12.928
March	6.383	6.448	6.545	6.967	7.434	8.012	8.998	9.363	9.480	12.928
April	6.383	6.448	6.545	6.961	7.504	8.055	8.998	9.363	10.033	12.928
May	6.383	6.448	6.545	7.040	7.560	8.055	8.998	9.363	10.033	12.928
June	6.376	6.448	6.545	7.040	7.813	8.234	8.998	9.363	11.108	12.970
July	6.376	6.448	6.545	7.104	7.813	8.480	8.998	9.363	12.075	12.912
August	6.376	6.448	6.767	7.252	7.813	8.728	8.998	9.363	12.346	12.912
September	6.433	6.485	6.767	7.252	7.813	8.977	8.998	9.363	12.389	12.961
October	6.445	6.496	6.767	7.252	7.813	8.977	8.998	9.432	12.433	13.690
November	6.445	6.496	6.508	7.252	7.813	8.977	8.998	9.432	12.433	13.693
December	6.445	6.510	6.508	7.263	7.813	8.977	8.998	9.432	12.433	13.690
Average	6.399	6.464	6.600	7.091	7.650	8.429	8.998	9.380	11.141	13.102

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
January	13.690	15.146	16.294	19.549	20.943	22.901	25.195	25.297	26.822	27.582
February	13.690	15.146	17.324	19.549	21.038	23.362	25.195	25.987	26.939	27.582
March	13.690	15.146	17.390	19.549	21.168	23.598	25.195	26.217	26.939	27.582
April	13.690	15.146	17.670	19.606	21.739	23.776	25.297	26.217	26.939	27.582
May	13.835	15.146	17.670	19.637	21.739	23.776	25.297	26.217	27.405	27.582
June	14.186	15.146	17.670	19.668	21.739	24.232	25.297	26.217	27.405	27.582
July	14.502	15.941	17.670	20.253	21.736	24.488	25.297	26.217	27.582	27.582
August	14.598	15.941	18.719	20.311	21.736	24.488	25.297	26.217	27.582	27.582
September	14.598	16.043	18.719	20.311	21.736	24.488	25.297	26.822	27.582	27.582
October	14.598	16.043	18.719	20.547	21.982	25.195	25.297	26.822	27.582	27.582
November	14.598	16.043	18.719	20.547	22.019	25.195	25.297	26.822	27.582	27.582
December	14.860	16.043	18.719	20.547	22.286	25.195	25.297	26.822	27.582	27.582
Average	14.210	15.577	17.940	20.006	21.655	24.224	25.271	26.323	27.313	27.582

Galvanized Sheets*

At Pittsburgh, Cents Per Pound

	1974	1975	1976	1977	1978	1979
Jan	10.80	14.05	15.40	17.40	18.60	21.95
Feb	10.80	14.05	15.40	17.40	19.80	21.95
Mar	10.80	14.05	15.40	17.40	19.80	21.05
Apr	10.80	14.05	15.40	17.40	19.80	21.95
May	12.15	14.05	15.40	17.40	20.075	21.95
June	12.15	14.05	16.40	17.40	20.075	21.95
July	14.05	14.05	16.40	18.60	20.075	21.95
Aug	14.05	14.05	16.40	18.60	20.80	22.85
Sept	14.05	14.05	16.40	18.60	20.80	22.85
Oct	14.05	15.40	16.40	18.60	20.80	22.85
Nov	14.05	15.40	16.40	18.60	20.80	22.85
Dec	14.05	15.40	17.40	18.60	20.80	22.85
Average	12.65	14.39	16.07	18.00	20.18	22.32

	1980	1981	1982	1983	1984	1985
Jan	22.85	25.25	26.25	26.25	30.30	30.30
Feb	22.85	25.25	26.25	28.00	30.30	30.30
Mar	22.85	25.25	26.25	28.00	30.30	30.30
Apr	23.80	25.25	26.25	28.00	30.30	30.30
May	23.80	25.25	26.25	28.00	30.30	30.30
June	23.80	26.20	26.25	28.00	30.30	30.30
July	23.80	27.15	26.25	28.00	30.30	30.30
Aug	23.80	27.15	26.25	28.00	30.30	30.30
Sept	23.80	27.15	26.25	30.30	30.30	30.30
Oct	23.80	27.15	26.25	30.30	30.30	30.30
Nov	23.80	27.15	26.25	30.30	30.30	30.30
Dec	23.80	27.15	26.25	30.30	30.30	30.30
Average	23.56	26.30	26.25	28.62	30.30	30.30

*Hot Dipped, 10 ga

Hot-Rolled Sheets

At Pittsburgh, Cents Per Pound

	1974	1975	1976	1977	1978	1979
Jan	8.55	11.00	11.70	13.25	14.175	16.60
Feb	8.55	11.00	11.70	13.25	14.175	16.60
Mar	8.55	11.00	11.70	13.25	14.175	16.60
Apr	8.55	11.00	11.70	13.25	14.175	16.60
May	9.55	11.00	11.70	13.25	15.275	16.60
June	9.55	11.00	11.70	13.25	15.275	16.60
July	11.00	11.00	12.45	14.175	15.275	16.60
Aug	11.00	11.00	12.45	14.175	15.80	17.50
Sept	11.00	11.00	12.45	14.175	15.80	17.50
Oct	11.00	11.70	12.45	14.175	15.80	17.50
Nov	11.00	11.70	12.45	14.175	15.80	17.50
Dec	11.00	11.70	13.25	14.175	15.80	17.50
Average	9.94	11.17	12.14	13.712	15.12	16.97

	1980	1981	1982	1983	1984	1985
Jan	17.50	19.50	20.80	20.80	23.75	23.75
Feb	17.50	19.50	20.80	22.05	23.75	23.75
Mar	17.50	19.50	20.80	22.05	23.75	23.75
Apr	18.45	19.50	20.80	22.05	23.75	23.75
May	18.45	19.50	20.80	22.05	23.75	23.75
June	18.45	20.15	20.80	22.05	23.75	23.75
July	18.45	20.80	20.80	22.05	23.75	23.75
Aug	18.45	20.80	20.80	22.05	23.75	23.75
Sept	18.45	20.80	20.80	23.75	23.75	23.75
Oct	18.45	20.80	20.80	23.75	23.75	23.75
Nov	18.45	20.80	20.80	23.75	23.75	23.75
Dec	18.45	20.80	20.80	23.75	23.75	23.75
Average	18.21	20.20	20.80	22.51	23.75	23.75

Cold-Rolled Sheets

At Pittsburgh, Cents Per Pound

	1974	1975	1976	1977	1978	1979
Jan	10.30	13.00	13.90	15.80	16.90	19.75
Feb	10.20	13.00	13.90	15.80	16.90	19.75
Mar	10.30	13.00	13.90	15.80	16.90	19.75
Apr	10.30	13.00	13.90	15.80	16.90	19.75
May	10.30	13.00	13.90	15.80	18.175	19.75
June	10.30	13.00	13.90	15.80	18.175	19.75
July	13.00	13.00	14.80	16.90	18.175	19.75
Aug	13.00	13.00	14.80	16.90	18.80	20.75
Sept	13.00	13.00	14.80	16.90	18.80	20.75
Oct	13.00	13.90	14.80	16.90	18.80	20.75
Nov	13.00	13.90	14.80	16.90	18.80	20.75
Dec	13.00	13.90	15.80	16.90	18.80	20.75
Average	11.82	13.22	14.43	16.35	17.17	20.16

	1980	1981	1982	1983	1984	1985
Jan	20.75	23.15	24.65	24.65	28.15	28.15
Feb	20.75	23.15	24.65	26.15	28.15	28.15
Mar	20.75	23.15	24.65	26.15	28.15	28.15
Apr	21.90	23.15	24.65	26.15	28.15	28.15
May	21.90	23.15	24.65	26.15	28.15	28.15
June	21.90	23.90	24.65	26.15	28.15	28.15
July	21.90	24.65	24.65	26.15	28.15	28.15
Aug	21.90	24.65	24.65	26.15	28.15	28.15
Sept	21.90	24.65	24.65	28.15	28.15	28.15
Oct	21.90	24.65	24.65	28.15	28.15	28.15
Nov	21.90	24.65	24.65	28.15	28.15	28.15
Dec	21.90	24.65	24.65	28.15	28.15	28.15
Average	21.62	23.96	24.65	26.69	28.15	28.15

Structural Steel Shapes

At Pittsburgh, Cents Per Pound

	1980	1981	1982	1983	1984	1985
Jan	18.00	19.90	22.90	23.90	23.90	23.90
Feb	18.00	19.90	22.90	23.90	23.90	23.90
Mar	18.90	19.90	22.90	23.90	23.90	23.90
Apr	18.90	21.65	23.90	23.90	23.90	23.90
May	18.90	21.65	23.90	23.90	23.90	23.90
June	18.90	21.65	23.90	23.90	23.90	23.90
July	18.90	21.65	23.90	23.90	23.90	23.90
Aug	18.90	21.65	23.90	23.90	23.90	23.90
Sept	18.90	21.65	23.90	23.90	23.90	23.90
Oct	18.90	22.90	23.90	23.90	23.90	23.90
Nov	18.90	22.90	23.90	23.90	23.90	23.90
Dec	18.90	22.90	23.90	23.90	23.90	23.90
Average	19.00	21.52	23.65	23.90	23.90	23.90

Special Quality Bars

At Pittsburgh, Cents Per Pound

	1980	1981	1982	1983	1984	1985
Jan	21.00	22.80	23.95	23.95	25.80	27.05
Feb	21.00	22.80	23.95	25.80	25.80	27.05
Mar	21.00	22.80	23.95	25.80	25.80	27.05
Apr	21.00	22.80	23.95	25.80	25.80	27.05
May	21.00	22.80	23.95	25.80	25.80	27.05
June	21.00	23.95	23.95	25.80	25.80	27.05
July	21.00	23.95	23.95	25.80	27.05	27.05
Aug	21.00	23.95	23.95	25.80	27.05	27.05
Sept	21.00	23.95	23.95	25.80	27.05	27.05
Oct	21.00	23.95	23.95	25.80	27.05	27.05
Nov	22.80	23.95	23.95	25.80	27.05	27.05
Dec	22.80	23.95	23.95	25.80	27.05	27.05
Average	21.30	23.29	23.95	25.65	26.43	27.05

Steel Plates

At Pittsburgh, Cents Per Pound

	1980	1981	1982	1983	1984	1985
Jan	19.45	21.50	24.25	24.25	25.75	25.75
Feb	19.45	21.50	24.25	25.75	25.75	25.75
Mar	19.45	23.25	24.25	25.75	25.75	25.75
Apr	20.70	23.25	24.25	25.75	25.75	25.75
May	20.70	23.25	24.25	25.75	25.75	25.75
June	20.70	23.25	24.25	25.75	25.75	25.75
July	20.70	23.25	24.25	25.75	25.75	25.75
Aug	20.70	23.25	24.25	25.75	25.75	25.75
Sept	20.70	23.25	24.25	25.75	25.75	25.75
Oct	21.50	24.25	24.25	25.75	25.75	25.75
Nov	21.50	24.25	24.25	25.75	25.75	25.75
Dec	21.50	24.25	24.25	25.75	25.75	25.75
Average	20.62	23.20	24.25	25.63	25.75	25.75

IRON ORE

Pig Iron, Production

Net Tons

Year	Basic	Bessemer	Low Phosphorous	Foundry	Malleable	All Other, incl. Direct Castings Silvery Pig Iron	Pig Iron
1974	91,195,000	1,100,000	106,000	1,528,000	1,582,000	600,000	95,909,000
1975	75,911,000	1,087,000	140,000	1,321,000	814,000	650,000	79,923,000
1976	82,894,000	1,150,000	112,000	1,469,000	800,000	425,000	86,984,000
1977	78,198,000	254,000	122,000	1,610,000	690,000	454,000	81,328,000
1978	84,497,000	295,000	110,000	1,856,000	471,000	450,000	87,679,000
1979	84,047,000	12,000	178,000	1,457,000	1,003,000	306,000	87,003,000
1980	66,964,000	29,000	72,000	719,000	799,000	134,000	68,721,000
1981	71,166,000	56,000	132,000	1,221,000	929,000	66,000	73,570,000
1982	42,604,000	—	56,000	239,000	377,000	33,000	43,309,000
1983	48,132,000	—	27,000	130,000	417,000	—	48,706,000
1984	51,108,000	—	27,000	199,000	570,000	—	51,904,000
1985*	50,400,000	—	26,000	196,000	562,000		51,200,000

*Iron Age estimate

Source: AISI

U.S. Iron Ore Supply

Year	U.S. Shipments	Exports	Imports	Net Supply
1976	76,726,254	2,913,309	44,389,538	118,202,483
1977	54,315,852	2,143,047	37,904,705	90,077,510
1978	82,611,422	4,213,194	33,616,378	112,014,606
1979	86,052,903	5,147,657	33,776,072	114,681,318
1980	68,527,008	5,689,198	25,058,200	87,896,010
1981	71,369,926	5,541,518	28,331,974	94,158,382
1982	35,864,871	3,177,620	14,715,345	47,402,596
1983	45,033,892	3,781,244	13,327,905	54,580,553
1984	50,888,000	3,500,000	14,100,000	62,488,000
1985*	46,100,000	4,900,000	16,100,000	57,600,000

*Domestic shipments minus exports, plus imports

**Estimate

Source: American Iron Ore Assn.

Tinplate

Single Reduced, 70 lb.
Dollars Per Base Box, Pittsburgh

	1974	1975	1976	1977	1978	1979
Jan	$ 9.75	$13.70	$13.70	$15.10	$17.05	$19.01
Feb	9.75	13.70	13.70	15.10	17.05	19.27
Mar	10.15	13.70	15.10	15.75	17.80	19.27
Apr	10.15	13.70	15.10	15.75	17.80	20.57
May	10.15	13.70	15.10	15.75	18.00	20.57
June	11.30	13.70	15.10	15.75	18.00	20.57
July	11.30	13.30	15.10	15.75	18.00	20.57
Aug	11.30	13.30	15.10	15.75	18.00	20.57
Sept	11.30	13.30	15.10	17.05	18.00	20.57
Oct	11.30	13.30	15.10	17.05	19.10	21.93
Nov	13.45	13.70	15.10	17.05	19.10	21.93
Dec	13.45	13.70	15.10	17.05	19.10	21.93
Average	11.11	13.70	14.86	16.07	18.08	20.57

	1980	1981	1982	1983	1984	1985
Jan	$21.93	$24.94	$26.29	$26.29	$27.74	$27.74
Feb	21.93	24.94	26.29	26.29	27.74	28.99
Mar	21.93	24.94	26.29	26.29	27.74	28.99
Apr	23.31	24.94	26.29	26.29	27.74	28.99
May	23.31	24.94	26.29	26.29	27.74	28.99
June	23.31	24.94	26.29	26.29	27.74	28.99
July	23.31	24.94	26.29	26.29	27.74	28.99
Aug	21.31	24.94	26.29	26.29	27.74	28.99
Sept	21.31	24.94	26.29	27.74	27.74	28.99
Oct	21.31	24.94	26.29	27.74	27.74	30.12
Nov	21.31	24.94	26.29	27.74	27.74	30.12
Dec	21.31	24.94	26.29	27.74	27.74	30.12
Average	22.89	24.94	26.29	26.77	27.74	29.17

Hot-Rolled Strip

At Pittsburgh, Cents Per Pound

	1974	1975	1976	1977	1978	1979
Jan	8.375	11.00	11.70	13.25	14.175	16.60
Feb	8.375	11.00	11.70	13.25	14.175	16.60
Mar	8.375	11.00	11.70	13.25	14.175	16.60
Apr	8.375	11.00	11.70	13.25	14.175	16.60
May	9.50	11.00	11.70	13.25	15.275	16.60
June	9.50	11.00	11.70	13.25	15.275	16.60
July	11.00	11.00	12.45	14.175	15.275	16.60
Aug	11.00	11.00	12.45	14.175	15.80	17.50
Sept	11.00	11.00	12.45	14.175	15.80	17.50
Oct	11.00	11.70	12.45	14.175	15.80	17.50
Nov	11.00	11.70	12.45	14.175	15.80	17.50
Dec	11.00	11.70	13.25	14.175	15.80	17.50
Average	9.875	11.17	12.15	13.70	14.79	16.97

	1980	1981	1982	1983	1984	1985
Jan	17.50	19.50	20.80	20.80	23.75	23.75
Feb	17.50	19.50	20.80	22.05	23.75	23.75
Mar	17.50	19.50	20.80	22.05	23.75	23.75
Apr	18.45	19.50	20.80	22.05	23.75	23.75
May	18.45	19.50	20.80	22.05	23.75	23.75
June	18.45	20.15	20.80	22.05	23.75	23.75
July	18.45	20.80	20.80	22.05	23.75	23.75
Aug	18.45	20.80	20.80	22.05	23.75	23.75
Sept	18.45	20.80	20.80	23.75	23.75	23.75
Oct	18.45	20.80	20.80	23.75	23.75	23.75
Nov	18.45	20.80	20.80	23.75	23.75	23.75
Dec	18.45	20.80	20.80	23.75	23.75	23.75
Average	18.21	20.20	20.80	22.51	23.75	23.75

SCRAP COMPOSITES

Average of Iron Age Scrap Prices Pittsburgh
Chicago, Philadelphia, Per Gross Ton
No. 1 Heavy Melt

	1980	1981	1982	1983	1984	1985
Jan	$99.67	$98.58	$84.34	$61.30	$92.70	$81.00
Feb	105.00	99.50	82.17	70.00	94.92	83.15
Mar	101.17	105.23	76.83	73.09	91.25	86.75
Apr	92.25	101.75	71.83	71.00	90.17	78.70
May	77.50	95.42	62.67	67.70	89.08	70.50
June	69.70	89.37	58.03	70.84	85.17	66.34
July	76.08	90.17	56.00	71.75	81.90	68.97
Aug	84.42	94.63	55.69	75.04	82.25	74.17
Sept	94.43	90.42	56.17	77.17	85.00	72.43
Oct	95.91	81.17	52.92	77.97	82.90	71.17
Nov	98.50	75.63	51.23	81.42	79.09	68.83
Dec	101.57	76.42	52.59	87.25	79.03	69.50*
Average	91.35	91.53	63.35	73.71	86.12	74.29*

No. 2 Bundles

	1980	1981	1982	1983	1984	1985
Jan	$62.50	$71.83	$56.50	$42.84	$59.96	$53.00
Feb	67.41	71.83	56.17	48.84	62.50	55.25
Mar	65.90	73.83	51.23	51.84	62.41	57.50
Apr	60.83	75.08	47.58	48.84	61.03	55.24
May	53.83	68.08	44.83	46.57	60.16	49.51
June	50.70	61.57	42.83	46.34	56.50	47.17
July	54.00	61.58	41.83	45.75	51.10	50.04
Aug	62.66	62.50	41.83	45.50	51.16	53.83
Sept	67.90	61.66	41.47	45.50	51.83	53.04
Oct	70.91	56.50	39.42	46.57	51.16	52.25
Nov	72.25	53.43	38.70	49.34	51.09	50.67
Dec	75.23	53.75	38.75	56.91	51.10	50.50*
Average	63.71	64.31	45.07	48.15	55.84	52.34*

*Estimate

In the next decade, 31 billion lbs.
of aluminum will find a home.

Pittsburgh

Prices of No. 1 Heavy Melt, per Gross Ton

	1980	1981	1982	1983	1984	1985
Jan	$102.00	$104.50	$94.50	$63.90	$98.30	$83.50
Feb	106.50	105.75	91.50	73.25	103.25	88.00
Mar	105.50	116.10	85.90	78.25	100.50	92.50
Apr	98.00	110.75	75.50	75.50	100.50	81.50
May	79.50	105.10	64.50	69.10	99.75	73.00
June	69.50	100.00	61.50	72.50	94.50	70.50
July	77.75	102.50	59.00	74.50	88.10	73.50
Aug	87.50	107.10	57.50	79.70	87.25	77.50
Sept	102.90	101.50	57.50	82.50	92.00	75.10
Oct	102.50	93.00	55.25	82.90	87.70	73.50
Nov	105.25	84.90	52.50	85.50	81.00	69.50
Dec	103.10	87.25	53.75	92.00	80.70	70.50*
Average	96.00	101.54	67.41	77.46	92.80	77.39*

No. 2 Bundles

	1980	1981	1982	1983	1984	1985
Jan	$61.00	$74.50	$60.60	$43.10	$59.50	$50.50
Feb	67.50	74.50	62.50	50.75	59.50	55.00
Mar	68.70	77.30	53.70	54.50	59.50	56.50
Apr	64.50	81.50	48.75	51.50	58.50	56.50
May	58.75	73.50	46.50	51.50	59.50	56.50
June	52.70	65.70	44.50	51.50	59.50	50.50
July	54.50	64.50	44.50	51.50	54.30	52.90
Aug	63.50	64.50	44.50	51.50	53.50	54.50
Sept	66.50	64.90	42.50	51.50	53.50	54.50
Oct	66.50	63.00	40.25	51.50	53.10	54.50
Nov	69.75	60.50	38.10	52.75	52.50	50.50
Dec	73.90	60.50	37.50	59.50	50.50	50.50*
Average	63.98	68.71	46.98	51.75	56.20	53.58*

*Estimate

Chicago

Prices of No. 1 Heavy Melt, Per Gross Ton

	1980	1981	1982	1983	1984	1985
Jan	$96.50	$96.50	$83.25	$62.70	$92.10	$80.50
Feb	100.50	101.25	79.50	74.25	90.50	80.50
Mar	96.50	108.10	71.70	77.50	87.50	85.50
Apr	86.00	104.50	67.00	72.50	85.50	77.90
May	70.50	96.75	58.50	68.30	85.50	68.50
June	63.50	88.50	52.30	71.50	80.50	61.50
July	67.50	88.50	49.50	72.25	77.50	63.10
Aug	77.50	97.50	50.70	76.90	78.50	72.50
Sept	88.50	91.25	51.50	79.50	81.50	72.30
Oct	93.75	81.00	46.50	79.50	80.90	71.75
Nov	98.75	75.50	46.50	80.75	80.50	69.50
Dec	105.10	75.50	49.50	84.75	80.50	70.50*
Average	87.05	91.99	58.87	75.03	83.40	72.84*

No. 2 Bundles

	1980	1981	1982	1983	1984	1985
Jan	$54.50	$77.00	$65.50	$44.90	$60.70	$59.00
Feb	58.50	80.25	62.50	50.75	64.00	59.50
Mar	57.50	80.70	56.50	54.50	64.50	64.50
Apr	53.25	83.25	52.50	49.50	64.50	61.50
May	49.50	73.25	47.50	44.50	64.50	62.38
June	48.30	64.50	43.90	44.50	59.50	49.50
July	51.50	65.75	41.50	44.50	49.50	51.90
Aug	61.50	68.70	41.50	44.50	49.50	61.50
Sept	72.10	69.00	41.50	44.50	51.50	61.10
Oct	81.75	60.50	38.50	44.50	51.50	58.75
Nov	87.50	60.50	38.50	45.75	53.78	56.50
Dec	86.50	63.25	39.25	56.25	56.30	57.50*
Average	63.24	70.81	47.43	47.38	57.48	58.64*

*Estimate

Philadelphia

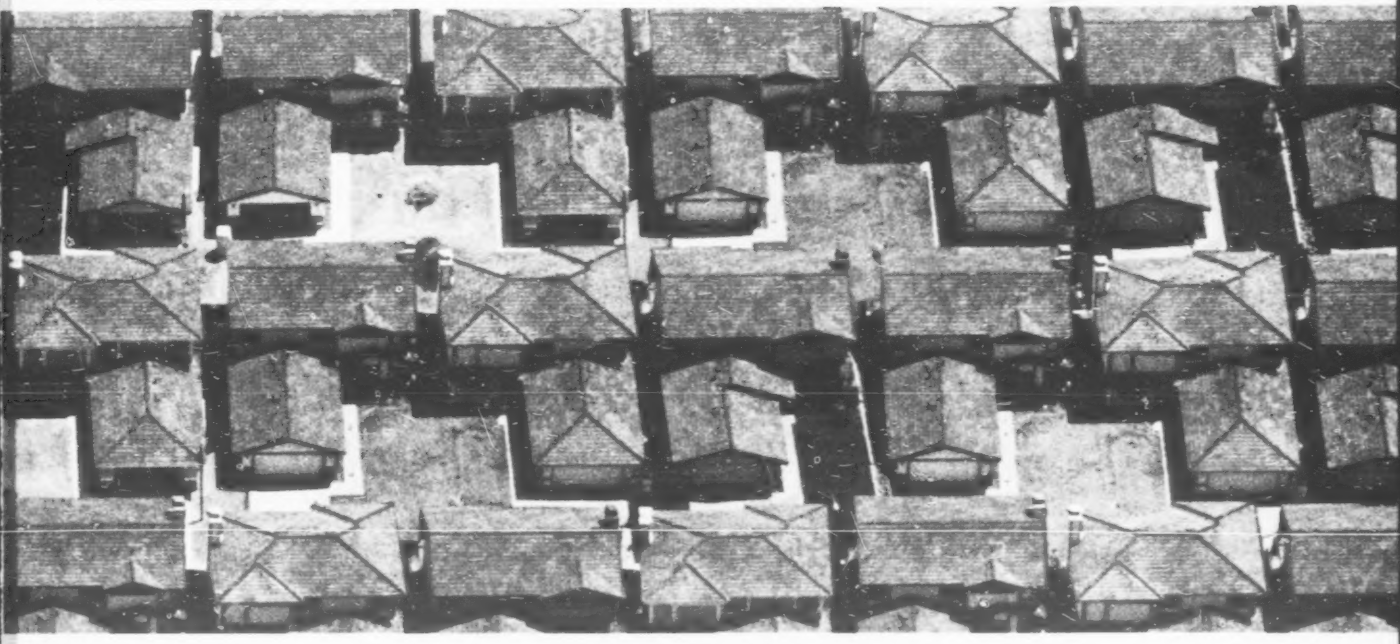
Prices of No. 1 Heavy Melt, Per Gross Ton

	1980	1981	1982	1983	1984	1985
Jan	$100.50	$95.75	$75.25	$57.50	$90.30	$79.00
Feb	108.00	91.50	75.50	62.50	91.00	81.00
Mar	101.50	91.50	72.90	63.50	85.75	82.25
Apr	92.75	90.00	71.50	65.00	84.50	76.90
May	82.50	84.50	65.00	65.70	82.00	70.00
June	76.10	79.50	60.30	68.50	80.50	67.00
July	83.00	75.50	59.50	68.50	80.50	70.30
Aug	88.25	79.30	59.50	68.50	81.00	72.50
Sept	91.90	76.50	59.50	69.50	81.50	69.90
Oct	91.50	69.50	57.00	71.50	80.10	68.25
Nov	91.50	66.50	54.70	78.00	75.75	67.50
Dec	96.50	66.50	54.50	85.00	75.90	68.50*
Average	92.00	81.05	63.76	68.64	82.40	72.76*

No. 2 Bundles

	1980	1981	1982	1983	1984	1985
Jan	$72.00	$64.00	$43.50	$40.50	$59.70	$49.50
Feb	76.25	60.75	43.50	45.00	64.00	51.25
Mar	73.50	60.50	43.50	46.50	63.25	51.50
Apr	64.75	60.50	41.50	45.50	59.10	47.70
May	53.25	57.50	40.50	43.70	56.50	42.00
June	51.50	54.50	40.50	43.00	50.50	41.50
July	56.00	54.50	39.50	41.25	49.50	45.30
Aug	63.00	54.30	39.50	40.50	50.50	45.50
Sept	65.10	51.50	39.50	40.50	50.50	43.50
Oct	64.50	46.00	39.50	43.70	48.90	43.50
Nov	64.50	39.30	39.50	49.50	47.00	45.00
Dec	63.50	37.50	39.80	55.00	46.50	46.50*
Average	63.93	51.41	40.80	44.55	53.83	46.07*

*Estimate



We'll be there.

With some aluminum companies, it's hard to tell if you're talking to aluminum people.

At Commonwealth, we're 100% committed to aluminum. Including the common alloy products that are vital to basic American industries like construction.

With the vast resources of our global parent, Comalco, we can make aluminum pay.

That means we'll be in business to supply your needs next year. And ten years from that. And twenty years from that.

We'll be there.

COMMONWEALTH ALUMINUM

3 BETHESDA METRO CENTER, BETHESDA, MARYLAND 20814

For Information, Circle 145

MAKE PLANS NOW FOR THE

1986 AWS WELDING SHOW

ATTEND THE PREMIER EVENT
IN THE WELDING INDUSTRY.

APRIL 15-17, 1986

GEORGIA WORLD CONGRESS CENTER

Atlanta

IT'S ALL HERE: Thousands of cost-saving metalworking products. Including the latest hi-tech developments, live demos, computerized equipment, robotics, CAD/CAM and more.

PLUS: The 67th Annual Convention of the **AMERICAN WELDING SOCIETY** with many practical and in-depth technical presentations.

EVERYTHING YOU NEED TO KNOW . . . AT ONE SHOW!
It's the nation's largest, every year. Plan now to be here: write or call today.

AMERICAN WELDING SOCIETY
Convention Department DD
550 N. W. LeJeune Road
P. O. Box 351040
Miami, Florida 33135
Telephone (305) 443-9353
Telex 51-9245 AMWELD SOC

Send me an '86 convention program with registration and hotel forms. DD

name ________ firm ________
address ________
city ________ state ________ zip ________
business telephone ________

SPECIAL! Advance registration saves you money. Call or write before February 28, 1986, for discounts.

For Information, Circle 146

NONFERROUS PRICES AND PRODUCTION

Aluminum Primary Ingot
Cents Per Pound, Freight Allowed

	1974	1975	1976	1977	1978	1979
Jan	29.00	39.00	41.00	48.00	53.00	55.25
Feb	29.00	39.00	41.00	48.00	53.00	58.00
Mar	29.24	39.00	41.00	48.00	53.00	58.00
Apr	31.50	39.00	41.75	51.00	53.00	59.50
May	31.50	39.00	44.00	51.00	55.25	59.50
June	33.40	39.00	44.00	51.00	55.25	59.50
July	33.50	39.00	44.00	53.00	55.25	62.75
Aug	35.94	41.00	47.00	53.00	55.25	62.75
Sept	38.70	41.00	48.00	53.00	55.25	62.75
Oct	39.00	41.00	48.00	53.00	55.25	66.25
Nov	39.00	41.00	48.00	53.00	55.25	66.25
Dec	39.00	41.00	48.00	53.00	55.25	66.25
Average	34.00	39.83	44.65	51.25	54.50	61.40
	1980	**1981**	**1982**	**1983**	**1984**	**1985 ***
Jan	66.25	76.00	76.00	76.00	81.00	48.86
Feb	66.25	76.00	76.00	76.00	81.00	49.89
Mar	66.25	76.00	76.00	76.00	81.00	49.52
Apr	72.00	76.00	76.00	76.00	81.00	50.28
May	72.00	78.00	76.00	76.00	81.00	50.23
June	72.00	78.00	76.00	76.00	81.00	46.86
July	72.00	78.00	76.00	76.00	81.00	45.78
Aug	72.00	78.00	76.00	76.00	81.00	46.30
Sept	72.00	78.00	76.00	76.00	81.00	44.75
Oct	76.00	78.00	76.00	81.00	81.00	44.07
Nov	76.00	78.00	76.00	81.00	81.00	43.16
Dec	76.00	78.00	76.00	81.00	81.00	45.10**
Average	71.56	77.33	76.00	77.25	81.00	47.07**

*Average London Metal Exchange spot price **Iron Age Estimates

Electrolytic Copper
Cents Per Pound

	1974	1975	1976	1977	1978	1979
Jan	68.70	70.50	63.00	65.20	62.75	56.63
Feb	68.70	63.00	63.00	67.50	62.25	89.36
Mar	68.70	63.00	64.50	70.63	61.62	97.75
Apr	68.70	63.00	68.00	74.00	64.00	90.50
May	81.20	63.00	70.00	72.80	64.33	89.50
June	86.10	62.25	70.00	69.88	65.23	86.39
July	86.30	61.50	74.00	68.75	63.50	85.95
Aug	86.70	63.00	74.00	64.00	66.47	90.24
Sept	83.00	63.00	74.00	60.00	66.83	92.36
Oct	78.25	63.00	72.00	60.00	69.54	97.72
Nov	75.80	63.00	65.00	60.00	71.20	98.49
Dec	73.00	63.00	65.00	61.29	71.50	106.10
Average	77.00	63.44	68.95	66.17	65.77	92.12
	1980	**1981**	**1982**	**1983**	**1984**	**1985**
Jan	116.95	88.55	79.54	79.00	68.00	66.25
Feb	134.17	86.01	79.41	82.75	70.00	68.50
Mar	105.97	86.74	76.34	81.13	74.25	67.25
Apr	94.57	88.15	76.87	82.40	76.50	72.25
May	92.91	85.99	78.86	82.81	71.50	71.75
June	92.32	85.11	71.67	80.88	69.25	69.00
July	102.88	83.99	71.64	81.75	66.50	68.50
Aug	101.29	88.32	71.82	79.75	66.50	68.25
Sept	98.78	84.90	71.87	76.75	65.50	67.75
Oct	98.91	83.03	71.94	71.50	64.00	68.50
Nov	96.02	81.93	72.25	68.64	67.50	67.25*
Dec	88.13	80.97	73.12	69.25	65.50	69.00*
Average	101.90	85.31	74.61	78.05	68.75	68.69*

*Iron Age Estimate

Zinc Prices

1974-81 Prime Western;
1982—High Grade
Cents Per Pound

	1974	1975	1976	1977	1978	1979
Jan	31.18	39.00	37.68	37.00	30.50	35.00
Feb	31.75	39.00	37.00	37.00	30.07	36.89
Mar	32.70	38.75	37.00	37.00	29.00	38.05
Apr	34.75	38.75	37.00	37.00	29.00	38.50
May	34.75	38.75	37.00	36.40	29.00	38.50
June	35.25	38.75	37.00	34.00	29.90	38.57
July	36.97	38.75	37.00	34.00	30.00	36.94
Aug	38.00	38.75	37.00	34.00	31.88	36.81
Sept	38.95	38.75	37.00	34.00	32.75	36.07
Oct	39.00	38.75	37.00	32.80	33.75	37.50
Nov	39.00	38.75	37.00	31.17	34.75	37.08
Dec	39.00	38.75	37.00	30.50	34.75	37.50
Average	35.94	38.79	37.06	34.57	31.28	37.51

	1980	1981	1982	1983	1984	1985*
Jan	37.50	41.25	42.60	39.50	50.75	44.00
Feb	38.67	41.63	43.00	40.00	51.00	43.75
Mar	38.92	43.63	43.00	38.90	52.50	45.50
Apr	38.50	43.75	35.75	38.25	53.00	46.00
May	37.50	46.50	36.00	40.00	52.50	46.50
June	36.50	46.63	35.80	40.00	52.25	45.75
July	35.50	46.63	38.50	40.90	50.00	44.50
Aug	35.97	49.75	39.50	43.50	48.75	42.00
Sept	36.60	49.75	41.00	46.00	46.75	40.25
Oct	37.50	46.50	41.00	46.80	45.00	38.00
Nov	38.60	46.75	40.20	49.00	45.00	35.00*
Dec	40.50	43.75	38.25	49.00	45.00	35.00*
Average	37.70	45.54	39.55	42.65	49.38	42.19*

*Iron Age Estimate

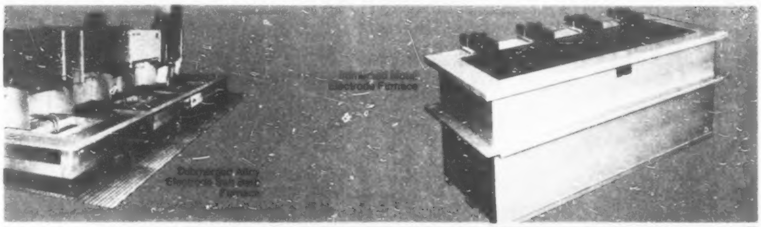
Lead, Common Grade Price

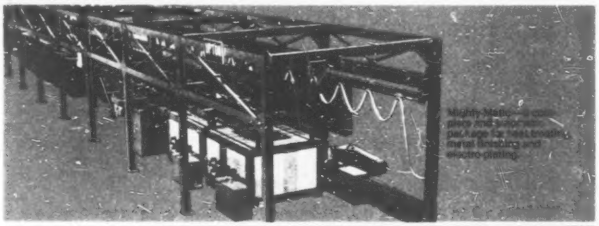
Cents Per Pound

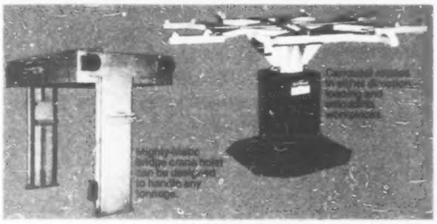
	1980	1981	1982	1983	1984	1985
Jan	51.29	34.13	29.95	22.40	26.50	20.50
Feb	50.00	30.68	28.00	21.95	26.00	19.75
Mar	49.55	35.28	26.00	21.75	26.50	19.25
Apr	45.45	37.63	26.50	22.00	27.00	20.50
May	36.00	37.00	26.50	21.55	26.50	20.50
June	34.25	38.25	25.80	21.20	29.00	20.00
July	35.77	41.25	27.90	21.15	32.25	19.75
Aug	40.97	44.63	27.90	21.15	30.00	19.50
Sept	42.40	42.50	26.75	22.00	25.75	19.50
Oct	45.00	37.63	26.00	25.50	24.00	19.00
Nov	44.00	34.46	23.75	26.00	26.50	18.50*
Dec	39.00	31.86	22.00	26.00	23.50	18.50*
Average	42.81	37.11	26.42	22.72	26.96	19.60*

*Iron Age Estimate

Why our Salt Bath Furnaces always earn their salt






Mighty-Matic bridge crane hoist can be designed to handle any tonnage.

Many of our water-cooled and patented air-cooled alloy electrode furnaces have returned their investments in as little as 18 months solely through savings in operational and maintenance costs.

For very good reasons: Upton totally submerged electrode furnaces offer 3-10 times more electrode life than side electrode units. You can forget emergency downtime due to electrode failure, and expect longer sustained production.

All this plus improved quality control from reduced decarb, less bath rectification, and maximum physical properties.

Let's discuss your next furnace requirement and we will show you *all* the advantages of an Upton custom package.

Furnaces that earn their salt

UPTON
INDUSTRIES, INC.

30435 Groesbeck Highway
Roseville, MI 48066
(313) 771-1200 Telex 23-5551

For Information, Circle 147

Straits Tin, Spot Price
Cents Per Pound

	1980	1981	1982	1983	1984	1985
Jan.	758.95	643.35	696.66	578.82	565.09	533.33
Feb.	785.67	617.29	660.43	584.84	566.52	518.93
Mar.	812.18	607.75	589.40	598.42	576.75	515.11
Apr.	785.72	597.65	570.95	619.66	577.59	532.64
May	784.62	568.09	583.13	612.03	573.80	528.29
June	756.62	569.28	566.40	600.44	574.12	543.42
July	752.61	591.87	561.69	593.28	565.52	565.50
Aug.	751.51	652.76	564.08	583.50	567.17	566.07
Sept.	778.59	675.15	572.26	579.72	562.29	552.42
Oct.	744.38	698.17	556.11	580.58	550.60	553.46
Nov.	697.21	709.45	558.37	583.76	551.51	—*
Dec.	655.05	708.72	561.57	568.99	547.70	—*
Average	N.A.	636.63	586.75	590.34	564.89	—*

U.S. cents per lb, EX-SMELTER, based on daily market in Kuala Lumpurin Malaysian dollars per kilo, beginning June, 1980. Prior prices are C.I.F., New York, based on Penang picul price.

N.A.—Not Applicable

*Trading suspended October 25, 1985

Electrolytic Nickel
Cents Per Pound

	1980	1981	1982	1983	1984	1985
INCO*	325.00	310.00	271.00	225.00	237.00	241.50***
LME**	296.00	270.00	219.00	212.00	216.00	222.19***

*Inco, Ltd.'s average realized price for primary nickel (excluding intermediates

**London Metal Exchange average spot price

***Iron Age Estimate

STEEL FOR INDUSTRY
For Prompt Service in Small Quantities
Call "the specialists"

WE CAN
Slit, Shear, Level, Edge Condition, Cold Reduce - all with the utmost precision

WE INVENTORY
1010-1018-1020 1035-1045 1065-1075-1080-1095-5160 4130 - HSLA - Blue Tempered Spring Steel, CR strip in all tempers and CR Annealed Spring Steel

OUR LAB
does:
- Chemical Analysis
- Tensile Testing
- Ductility Testing
- Hardness Testing

OUR STOCKS ARE
Cold Rolled, Hot Rolled, Hot Rolled Pickled, Annealed, stress relieved and as rolled in plates, strip, sheets, coils and bars

—SEND FOR CATALOG

Admiral®
STEEL CORPORATION
4152 W. 123rd St., Chicago (Alsip), Ill. 60658
(800) 323-7055 • (312) 928-9600 • (312) 388-9600

For Information, Circle 149

CHILTON'S
IRON AGE
TOOL STEEL DIRECTORY

- TOOL STEELS
  High Speed -- Molybdenum, Tungsten, Chromium.
  Hot Work — Tungsten, Molybdenum, High Carbon, Carbon, High Chromium.
  Cold Work...Shock Resisting...Mold...
  Special Purpose...Water Hardening.
- CARBIDES
- CERAMICS
- Index of Tool & Die Steels and their manufacturers.
- Cross Index by AISI Symbols.
- Alphabetical list of producers and distributors.

31st Edition $10.95

Completely revised and up to date, this volume is a handy guide to the identification and selection of tooling materials: tool and die steels, sintered carbides, and ceramics. Characteristics of each material, cross indexes, and sources of supply — both manufacturers and distributors — are included. You'll also find the 1981 changes in the classification of tool steels made by the American Iron and Steel Institute. There is a Carbide Grade Chart which compares cemented carbide cutting materials.

ORDER FORM

Please send _______ copies of the IRON AGE Tool Steel Directory, at $10.95 each. $ __________ enclosed. Make checks payable to IRON AGE. Mail to C. Wuttke, IRON AGE, Chilton Company, Chilton Way, Radnor, PA 19089.

NAME ______________________________

COMPANY ______________________________

STREET ADDRESS ______________________________

CITY, STATE, ZIP ______________________________

U.S. Production of Primary Aluminum

Short tons

	1982	1983	1984	1985		1982	1983	1984	1985
Jan	350,548	279,299	377,409	362,166	July	296,986	312,991	384,912	321,909
Feb	310,405	245,601	357,391	318,145	Aug	287,077	327,051	378,747	318,718
Mar	336,276	273,086	385,496	344,223	Sep	271,147	329,625	362,805	309,012
Apr	318,619	270,450	382,946	325,298	Oct	275,277	352,733	373,009	312,272
May	320,897	291,751	402,479	334,872	Nov	266,366	349,945	358,659	304,000*
June	299,914	288,209	386,850	317,976	Dec	275,120	375,574	367,719	311,000*
					Total	3,608,632	3,696,315	4,518,422	3,879,591*

Source: Aluminum Association

*IA Estimate

U.S. Production of Slab Zinc

Short tons

	1981	1982	1983	1984	1985
Jan	33,445	26,706	20,010	25,526	30,861
Feb	31,457	23,845	22,766	24,346	28,457
Mar	34,450	23,639	24,994	23,865	33,238
Apr	34,051	21,314	24,709	28,421	28,210
May	32,218	23,656	25,858	27,252	26,854
June	30,828	23,713	23,990	30,072	21,288
July	33,018	20,570	17,645	26,961	23,632
Aug	33,534	22,433	25,601	26,033	26,892
Sept	29,424	26,549	25,064	25,400	27,377
Oct	29,778	27,348	26,532	25,410	30,669
Nov	29,276	20,606	27,275	25,175	27,138
Dec	25,301	19,945	24,086	31,212	28,200*
Total	376,780	280,326	288,530	319,673	332,816*
Average	31,398	23,361	24,041	26,639	27,735*

Source: ABMS

*IA Estimate

U.S. Production of Refined Copper

Short tons

	1981	1982	1983	1984	1985
Jan	133,500	117,500	97,300	98,800	113,500
Feb	116,300	123,400	100,600	100,700	101,200
Mar	152,200	121,500	131,900	117,100	118,800
Apr	155,800	116,400	125,500	120,500	122,400
May	135,000	107,500	112,200	127,900	124,100
June	158,300	108,600	114,500	125,600	100,800
July	131,700	81,800	73,100	123,000	99,900
Aug	124,000	77,600	90,600	126,100	96,800
Sept	140,500	80,600	91,200	101,800	93,000
Oct	127,300	80,100	110,400	119,500	112,900
Nov	124,900	92,100	89,100	95,400	100,000*
Dec	147,900	90,800	100,200	101,400	106,000*
Total	1,647,400	1,197,900	1,236,600	1,357,800	1,289,400*
Avg	137,283	99,825	103,050	113,150	107,450*

Source: ABMS

*IA Estimate

U.S. Production of Refined Lead

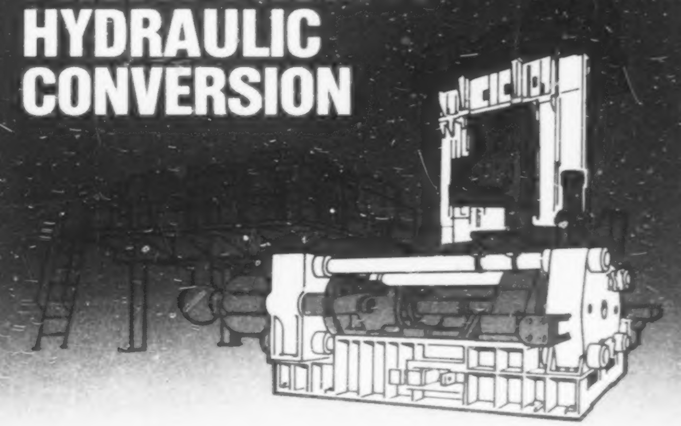
Short tons

	1981	1982	1983	1984	1985
Jan	57,984	50,527	57,029	51,497	41,143
Feb	53,569	45,193	50,943	51,374	50,255
Mar	58,170	43,994	52,825	43,046	56,287
Apr	52,741	36,111	49,938	39,983	52,701
May	35,038	54,323	47,230	39,231	53,446
June	24,378	52,974	42,045	26,161	50,876
July	33,027	44,224	39,525	28,401	32,455
Aug	45,097	46,362	45,283	29,064	46,613
Sept	43,704	49,201	41,226	25,287	44,869
Oct	46,082	50,574	49,972	40,764	39,289
Nov	29,412	50,546	50,886	27,979	32,478
Dec	44,036	48,585	46,381	26,451	33,000*
Total	533,238	572,614	572,283	479,238	533,412*
Average	44,437	47,718	47,668	35,770	44,451*

Source: ABMS

*IA Estimate

PROFIT FROM A HYDRAULIC CONVERSION



Do you need a machine for a new production method or process? Do you have a machine you seldom or no longer use?

- **CONSIDER AN OILGEAR CONVERSION.** Converting an old machine may be profitable in more ways than one. Because you're using an existing frame, etc., the cost will be less than buying a new machine . . . plus delivery and start-up time will be less.
- Oilgear may be able to change the basic function or utilization of your machine for big additional savings through *total* hydraulic and electrical conversion. The design and application of a new power and control system will be tailored to your new needs.
- Oilgear has over 60 years of industrial application expertise in most processes and environments. We may already be familiar with what you need. We engineer and manufacture our own electronic and hydraulic components and systems. We are one of the few major manufacturers to offer this conversion service on machinery originally equipped with other manufacturer's power and control systems.
- Can we increase your profitability with a conversion?

THE OILGEAR COMPANY
2300 S. 51st St., Milwaukee, WI 53219
1-800-558-6636 In WI call (414) 327-1700

Oilgear

19008A

For Information, Circle 151

PRICE & PRODUCTION DATA

(Effective December 16,1985)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	168	175	163	134
Pittsburgh	222	217	178	179
Youngstown	97	93	100	90
Lake Erie	123	119	124	111
Detroit	134	141	157	143
Chicago	386	441	478	399
Cincinnati	82	78	80	87
St. Louis	77	79	80	72
Southern	199	207	202	166
Western	71	83	83	64
U.S. Production	1,557	1,633	1,645	1,445

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8-13-85. **59.4¢—Pickands Mather, 8-1-85 delivered hold of vessel, upper lake ports. ***72.5¢—U.S. Steel as of 8-16-85. 86.9¢—Oglebay Norton 3-25-82, Hanna Mining and Cleveland Cliffs 2-26-82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective December 16,1985)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,557	1,633	83,726	87,315
Capability Utilization Rate	61.2	64.2	65.7	66.7

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	27.582
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 70.17	$ 69.50	$ 68.83	$ 78.50
No. 2 bundles	$ 50.50	$ 50.50	$ 50.83	$ 51.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 71.50	$ 69.50	$ 69.50	$ 79.50
No. 1 steel, Philadelphia	69.50	69.50	67.50	75.50
No. 1 steel, Chicago	69.50	69.50	69.50	80.50
No. 1 bundles, Detroit	64.50	64.50	56.50	61.50
Low Phos., Youngstown	69.50	69.50	66.50	72.50
No. 1 mach'y cast., Pgh	68.50	68.50	68.50	66.50
No. 1 mach'y cast., Phila	91.50	91.50	91.50	98.50
No. 1 mach'y cast., Chi	97.50	97.50	97.50	110.50

*Finished Steel Composite. Weighted index of steel bars, shapes, plates, wire, tin, black pipe, hot and cold rolled sheets and strip.

**Pig Iron Composite. Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite. Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective December 16,1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	46.89	44.51	12/16/85
Copper (C)	67.50-69.00	67.00-69.00	12/16/85
Lead	18.50-19.50	18.25-19.50	12/16/85
Magnesium ingot	153.00	148.00	12/9/85
Nickel (LME)	183.92	181.37	12/16/85
Zinc	35.00	38.00	11/6/85

ALUMINUM: Avg. [illegible] week & previous week. COPPER (C): [illegible] LEAD: [illegible] MAGNESIUM: 99.8% [illegible] NICKEL: Avg. [illegible] week & previous week. ZINC: High grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be per lb. contained Be	$236.00
Beryllium copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.25-1.50
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz	$318.60
Indium, dollars per troy oz	$2.50
Iridium, dollars per troy oz	$430.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb. f.o.b. N.Y.	$320.00-330.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.00-3.13
Nickel electro (PDCR)	$3.29
Palladium, per troy oz	$94.50
Platinum, per troy oz	$327.00
Rhodium, per troy oz	$1,125.00
Silver ingots, per troy oz	$5.85
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red	$9.00-9.50
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo)

Dec. 9—TRADING
Dec. 10—SUSPENDE
Dec. 11—
Dec. 12—
Dec. 13—

Scrap Prices
Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	59	52
Yellow brass	50½	41¼
Red brass	54½	48½
Comm. bronze	56	49½
Mang. bronze	43	42
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	58
No. 2 copper wire	50
Light copper	41

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	54	
No. 2 copper wire	46	
Light copper	37	
No. 1 composition	47	
No. 1 comp. turnings	46	
Hvy. yellow brass solids	31	
Hvy. yellow brass turnings	28	
Radiators	36	
Aluminum		
New mixed clips	31	— 32
Old sheet	29	— 30
Old cast	29	— 30
Clean dry borings	30	— 31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	24	— 26
Mixed L.C. clips	21	— 22
[illegible] sheets and cast	20	— 21
[illegible] and turnings	16	— 18
[illegible]inum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 39
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	14	— 15
Electrotype	13	— 15

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 17
Old diecast zinc	11	— 13

St. Louis price reporting change

Effective Jan. 6, *Iron Age* will revise scrap prices reported for the **St. Louis** market to align its prices with those paid by the consumers in that region. For some of the grades in that market, the actual market prices may not change as much as the *Iron Age* prices will.

For additional information, contact Michael Marley, Managing Editor, Iron Age, Chilton Co., Chilton Way, Radnor, Pa. 19089.

EFFECTIVE DECEMBER 16,1985

(Effective December 16,1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	61.00 to	62.00
No. 1 dealer bundles	88.00 to	89.00
No. 1 factory bundles (auto)	88.00 to	89.00
No. 2 bundles	49.00 to	50.00
No. 1 busheling	83.00 to	84.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	38.00 to	39.00
Low phos. punchings plate	90.00 to	91.00
Heavy turnings	63.00 to	64.00
No. 1 RR hvy. melting	78.00 to	79.00
Rails, 2 ft. and under	97.00 to	98.00
Scrap rails, random lgth	72.00 to	73.00
RR specialties	93.00 to	94.00
No. 1 machinery cast	68.00 to	69.00
Cupola cast	61.00 to	62.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	515.00 to	525.00
18-8 turnings	415.00 to	425.00

Chicago

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	85.00 to	86.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	56.00 to	57.00
No. 1 busheling	82.00 to	83.00
Shredder scrap	81.00 to	82.00
Machine shop turnings	38.00 to	39.00
Mixed borings and turnings	40.00 to	41.00
Shoveling turnings	42.00 to	43.00
Cast iron borings	42.00 to	43.00
Low phos. forge crop	93.00 to	94.00
Low phos. punchings plate		
1/4 in. and heavier	109.00 to	110.00
Low phos. 2 ft. and under	104.00 to	105.00
No. 1 RR hvy. melting	73.00 to	74.00
Scrap rails random lgth	79.00 to	80.00
Rerolling rails	102.00 to	103.00
Rails, 2 ft. and under	100.00 to	101.00
RR couplers and knuckles	87.00 to	88.00
RR car axles	100.00 to	101.00
No. 1 machinery cast	97.00 to	98.00
Cupola cast	83.00 to	84.00
Stove plate	87.00 to	88.00
Steel car wheels	87.00 to	88.00
Stainless		
18-8 bundles and solids	500.00 to	510.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	130.00 to	135.00
430 turnings	95.00 to	100.00

Philadelphia

No. 1 hvy. melting	$ 68.00 to	$ 71.00
No. 2 hvy. melting	60.00 to	63.00
No. 1 dealer bundles	51.00 to	54.00
No. 2 dealer bundles	44.00 to	47.00
No. 1 busheling	80.00 to	83.00
Shredder scrap	80.00 to	83.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	73.00 to	76.00
Low phos. 2 ft. punchings	94.00 to	97.00
Electric furnace bundles	82.00 to	85.00
RR specialties	73.00 to	76.00
Rails, 2 ft. and under	98.00 to	101.00
Cupola cast	76.00 to	79.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	90.00 to	93.00

Detroit

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	25.00 to	26.00
No. 1 busheling	63.00 to	64.00
Drop forge flashings	40.00 to	41.00
Machine shop turnings	31.00 to	32.00
Mixed borings and turnings	12.00 to	13.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	17.00 to	18.00
Heavy breakable cast	33.00 to	34.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	460.00 to	470.00
18-8 turnings	345.00 to	355.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 60.00 to	$ 61.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 dealer bundles	36.00 to	37.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	61.00 to	62.00
Galvanized bundles	59.00 to	60.00

Cleveland

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 56.00 to	$ 57.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	76.00 to	77.00
No. 1 factory bundles	56.00 to	57.00
No. 2 bundles	30.00 to	31.00
No. 1 busheling	65.00 to	66.00
Machine shop turnings	22.00 to	23.00
Shoveling turnings	22.00 to	23.00
Cast iron borings	15.00 to	16.00
Cut structural & plates		
5 ft. and under	63.00 to	64.00
Cut structural & plates		
2 ft. and under	84.00 to	85.00
Low phos. punchings plate	84.00 to	85.00
Foundry steel, 2 ft. & under	51.00 to	52.00
No. 1 RR hvy. melting	57.00 to	58.00
Rails, 2 ft. and under	86.00 to	87.00
Rails, 18 in. and under	88.00 to	89.00
No. 1 machinery cast	75.00 to	76.00
Mixed cast	42.00 to	43.00
Stainless		
18-8 bundles	445.00 to	455.00
18-8 turnings	330.00 to	340.00
430 bundles	100.00 to	110.00

Buffalo

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	40.00 to	41.00
No. 1 busheling	65.00 to	66.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	15.00 to	16.00
Mixed boring and turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	23.00 to	24.00
Low phos. plate	73.00 to	74.00
Structural and plate		
2 ft. and under	77.00 to	78.00
Rails, 2 ft. and under	79.00 to	80.00
Scrap rails, random lgth	64.00 to	65.00
No. 1 machinery cast	77.00 to	78.00
No. 1 cupola cast	59.00 to	60.00

St. Louis

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	33.00 to	34.00
Foundry steel, 2 ft.	38.00 to	39.00
No. 1 dealer bundles	44.00 to	45.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	53.00 to	54.00
Rails, random length	59.00 to	60.00
Rails, 18 in. and under	72.00 to	73.00
RR specialties	70.00 to	71.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	89.00 to	90.00
Steel car wheels	81.00 to	82.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	64.00 to	65.00

Birmingham

No. 1 hvy. melting	$ 68.00 to	$ 69.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	68.00 to	69.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	68.00 to	69.00
Shredder scrap	84.00 to	85.00
Machine shop turnings	24.00 to	25.00
Shoveling turnings	38.00 to	39.00
Cast iron borings	37.00 to	38.00
Electric furnace bundles	64.00 to	65.00
Elec. furnace, 3 ft. & under	64.00 to	65.00
Structural and plate, 2 ft.	86.00 to	87.00
Structural and plate, 4 ft.	81.00 to	82.00
No. 1 RR hvy. melting	81.00 to	82.00
Scrap rails, random lgth	69.00 to	70.00
Rails, 2 ft. and under	85.00 to	86.00
Angles and splice bars	81.00 to	97.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	71.00 to	75.00

Cincinnati

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	15.00 to	16.00
Low phos. 18 in. and under	79.00 to	80.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	74.00 to	75.00
No. 1 cupola cast	59.00 to	60.00
Heavy breakable cast	24.00 to	25.00
Drop broken cast	71.00 to	72.00

New York

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast chem. borings	35.00 to	36.00
No. 1 machinery cast	74.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	445.00 to	455.00
18-8 turnings	343.00 to	365.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ [illegible] to	$ 52.00
No. 2 hvy. melting	[illegible] to	43.00
No. 1 dealer bundles	63.00 to	65.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	78.00 to	80.00
Mixed cupola cast	46.00 to	49.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	17.00 to	19.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	11.00 to	12.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under		
(foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	90.00 to	92.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 81.00
No. 2 hvy. melting, cut 2 ft. and under	70.00
No. 1 dealer bundles	86.00
No. 2 bundles	61.00
Mixed steel scrap	59.00
Bush. new fact. prep'd	81.00
Bush. new fact. unprep'd	64.00
Machine shop turnings	34.00
Short steel turnings	34.00
Mixed borings and turnings	19.00
Cast scrap	89.00

Houston

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	54.00 to	55.00
No. 2 bundles	40.00 to	41.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	30.00 to	31.00
Shredder scrap	74.00 to	75.00
Cut structural plate, 2 ft. and under	97.00 to	98.00
Cut structural plate, 5 ft. and under	79.00 to	80.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	83.00 to	84.00

PRODUCER KEY
With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co.,
Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Div., National
Steel Corp., Granite City, Ill.
G3 Great Lakes Steel Div., National
Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp.,
Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kenzo Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens, Inc., Coatesville, Pa.

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel
Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel
Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston
N4 Northwestern Steel & Wire Co.,
Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Nelsen Steel & Wire Co., Chicago
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., North Tonawanda, N.Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaco, Pa.
S10 Seneca Steel Corp., Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electric Corp., Chicago
T10 Tennessee Forging Steel Corp.,
Harriman, Tenn.
T11 Teledyne Columbia-Summerill,
Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh

W3 Weirton Steel Corp., Weirton, W. Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh
Corp., Pittsburgh
W14 Whittar Steel Strip Div., Whittar
Industries, Ltd., Detroit

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

[illegible]

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Atlanta	24.16	30.15	33.60	26.66	24.88	23.22	21.05	28.73	35.62	44.85	57.90	66.57
Baltimore	24.11	29.97	34.02	31.14	30.35	25.49	23.78	33.08	46.54	50.79	57.10	65.47
Birmingham	22.79	27.62	33.60	26.44	23.68	23.33	22.35	29.13	43.72	49.65	58.62	66.75
Boston	30.96	37.08	43.12	41.54	31.23	29.70	25.01	32.57	38.73	40.46	49.57	54.66
Buffalo	27.96	33.52	39.73	34.24	28.37	25.84	21.26	30.07	37.80	38.46	44.68	52.51
Chicago	25.81	32.81	36.03	24.23	21.92	20.59	19.30	24.99	29.30	36.30	44.26	46.92
Cincinnati	26.69	32.94	35.92	24.96	24.66	19.88	18.68	26.34	31.24	37.41	42.52	48.90
Cleveland	25.57	32.17	35.64	27.60	24.19	22.15	19.05	28.25	34.10	37.45	42.76	50.25
Denver	28.28	35.17	34.44	31.39	26.86	24.20	21.49	34.15	44.04	51.41	57.29	63.86
Detroit	26.43	33.16	36.33	24.16	24.66	20.50	19.06	26.32	31.14	37.08	42.57	49.48
Houston	24.82	27.06	30.33	33.41	24.72	24.21	22.05	36.65	42.12	41.99	53.63	60.00
Kansas City	27.62	34.67	36.90	26.86	25.35	21.25	18.40	30.97	36.41	39.84	44.87	50.82
Los Angeles	24.23	29.24	35.08	28.90	26.27	32.05	27.09	34.71	46.00	51.04	57.30	65.41
Memphis	21.73	30.60	31.64	26.90	24.43	24.15	21.65	30.50	33.71	44.20	54.48	63.87
Milwaukee	26.03	32.57	35.82	26.25	24.99	21.28	19.27	25.16	32.23	36.77	41.78	48.91
New York	29.19	36.09	40.14	36.38	30.67	25.04	22.47	33.05	36.74	41.43	44.90	51.13
Philadelphia	25.17	32.64	38.45	38.00	27.96	26.10	22.25	29.00	37.35	42.07	49.95	56.28
Pittsburgh	34.95	38.19	42.78	34.22	33.37	27.78	25.62	27.40	35.31	39.15	44.84	50.07
Portland	25.98	29.47	36.46	31.41	32.56	34.45	27.54	37.58	46.18	51.65	63.57	
San Francisco	24.13	29.74	35.87	29.06	25.69	29.86	27.16	35.30	47.99	51.54	57.35	65.41
Seattle	27.37	28.24	35.47	27.92	21.37	27.40	27.15	35.25	43.61	57.31	63.62	65.16
Spokane	20.41	28.65	28.65	32.28	32.02	33.63	23.45	36.94	39.45	42.17	—	54.16
St. Louis	26.11	29.84	29.84	26.73	23.57	19.95	19.63	29.16	34.95	38.09	43.11	49.76
St. Paul	25.90	31.58	31.58	30.83	23.67	26.52	19.13	28.60	34.40	37.29	42.36	49.30

[illegible]

*[illegible]

Codes identify Producers listed on p. 77. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A. = Not available

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(2)	$473.00
C10, U1	$473.00
R3	$453.00
Midwest	
R3, W5	$453.00
U1	$473.00
S1, I3	$473.00
C10	$473.00
K2	$473.00
West	
C6	$420.00
Alloy, East	
R3	$492.00
B3	$512.00
U1, C10	$512.00
Midwest	
W5	$492.00
U1, I3	$512.00
C10	$512.00
R3	$492.00
S1	$512.00
West	
C6	$469.00

Structurals

Carbon, East	
B3	22.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3	23.90
T10	23.90
N4	23.90
South	
C16	23.90
T10	22.90
High Strength, Low Alloy	
East	
B3	22.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
South	
C16	23.90
Wide Flange, Carbon, East	
B3	22.90
U1	22.75
J3	23.90
Midwest	
U1	22.75
N4	23.90
I3	23.90
Wide Flange, High Strength Low Alloy	
East	
U1	24.30
Midwest	
U1	24.30

Strip

Hot Rolled, Carbon, Cut & Edge—all widths, East	
U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
I3, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1	23.75
U1, A7	23.75
I3, B3	23.75
M2	22.05
R3	22.05
South	
R3	22.05
Cold Rolled, Carbon Max. 25%, East	
E4	29.75
S10	29.60
P15	28.80
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05
High Strength, Hot Rolled, Low Alloy, Cut Edge & Mill Edge, All widths (plus extras)*	
Midwest	
M2, R3	22.05
W3, J3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05
High Strength, Cold Rolled, Low Alloy, Mill Edge	
Midwest	
S1	37.05
Alloy, Hot Rolled, Midwest (plus extras)*	
S1	26.10
I4	25.20
Alloy, Cold Rolled, East (plus extras)*	
E4 M8	43.35
B4	49.75
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot Rolled, Carbon (18 Ga & Hvy), East	
B3	23.75
J3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5	23.75
S1, B3	23.75
I3, A7	23.75
West	
U1	24.25
South	
R3	22.05
Cold Rolled, East, (Class I)	
B3(2)	28.15
J3	26.15
U1	28.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.85
J3	26.15
D1	26.15
U1, W5	28.15
S1, B3	28.15
I3, A7	28.15
West	
U1	28.65
South	
R3	24.65
Galvanized (hot dipped), East	
B3(2)	30.30
U1	30.30
Midwest	
J3, D1, W3	28.00
R3, Y1	28.00
G2, M11	30.00
U1, W5	30.30
S1	30.30
I3	30.30
A7	30.30
West	
U1	30.80
South	
R3	28.00
Enameling, Midwest	
U1, S1	29.65
I3, A7	29.65
J3	27.65
Long Terne, Midwest	
W5, A7, U1	31.65
R3	29.35

Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
East	per base box
J3	26.29
U1	30.12
Midwest	
U1	30.12
J3	26.29
M11	27.54
W3	26.39
W5	28.99
West	
U1	30.62
South	
U1	30.12
Double Reduced (55 lb)**	
Midwest	
M11	21.95
J3	21.49
U1	24.33
W3	21.49
W5	23.38
West	
U1	24.83
South	
U1	24.33
Black Plate	
Single Reduced (70 lb)*	
East	
B3	24.81
Midwest	
J3, W3	24.01
I3	24.57
W5	25.55
U1	26.55
M11	26.27
West	
U1	26.55
Double Reduced (55 lb)	
East	
B3	20.49
Midwest	
U1	21.32
M11, W5	20.49
W3, J3	18.93
West	
U1	21.32
South	
U1	21.32

*75 lb—base weight extra 69¢
**50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot Rolled (Special quality)	
East	
R3, K3, R5	25.80
I3	25.80
U1	27.05
C10	27.05
B3	27.05
Midwest	
I4	26.00
U1, I3	27.05
R3, T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
C16	25.80
Cold Finished Carbon, East	
A11	22.15
R3	33.75
T11, S8	31.00
J3(4), L2	31.00
M8, W10	31.00
N1	24.475
R4, B4	33.25
C10	31.00
Midwest	
W10, R3	33.25
J3	31.00
B1	33.45
L2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
West	
R3	37.15
South	
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot Rolled, East	
R5, K3	27.95
R3, J3	27.95
U1	29.20
B3	29.20
C10	29.20
Midwest	
R3	27.95
I3, C10, U1	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1	37.90
R4	37.10
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
Midwest	
R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
L2	34.85
B5, M9	38.60
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3	23.25
L4, U1	25.75
P2	23.25
J3	26.75
Midwest	
B3	23.25
I3	25.75
J3, A7	22.80
U1, I4, S1	25.75
R3	26.75
West	
U1	25.75
O2	23.00
South	
R3	25.75
U1	25.75
Alloy East	
B3	31.05
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	31.05
I4, U1	33.55
West	
O2	31.00
South	
U1	33.55

Wire

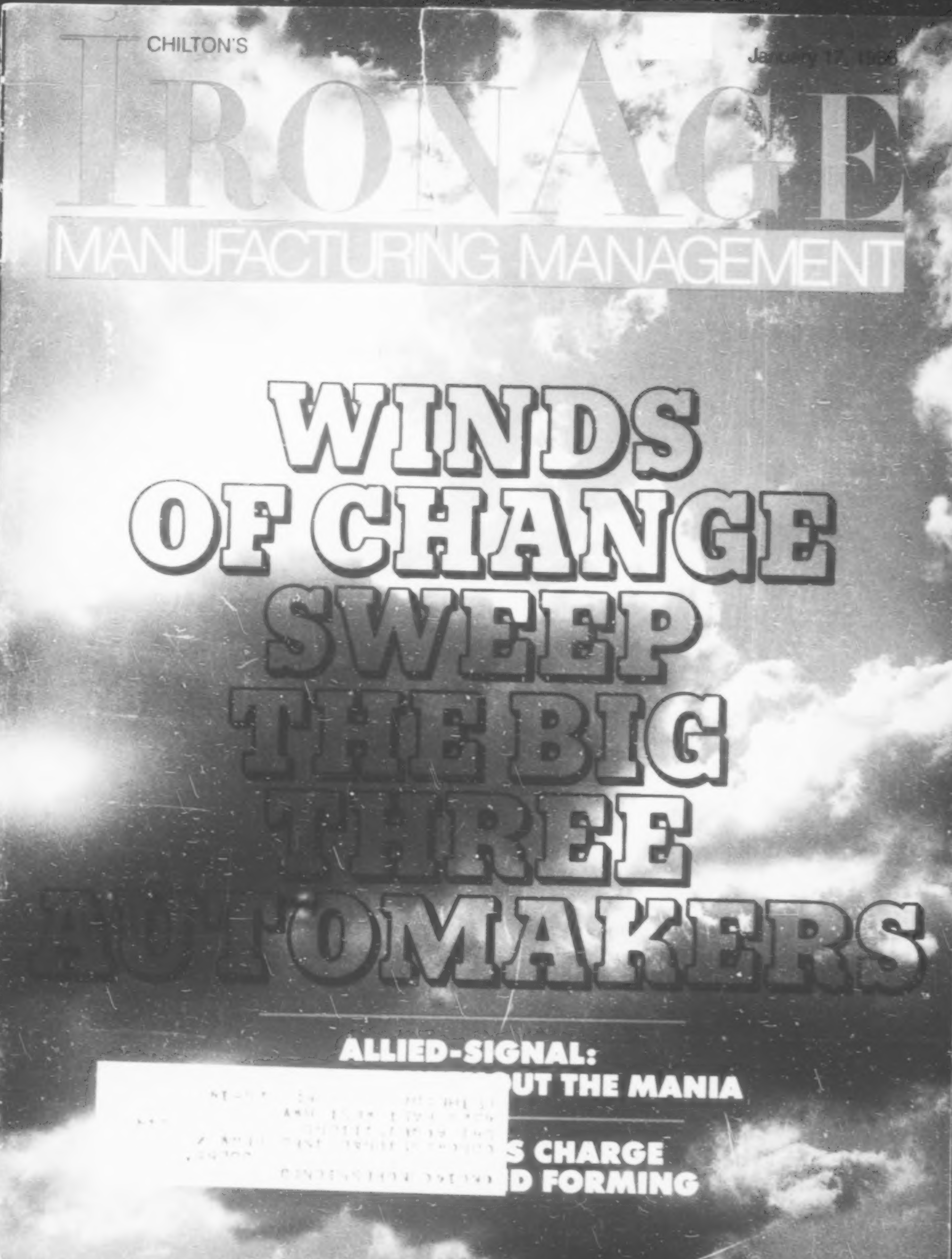
Carbon Steel Wire, East	
B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

CHILTON'S

IRON AGE

MANUFACTURING MANAGEMENT

January 17, 1988



WINDS OF CHANGE SWEEP THE BIG THREE AUTOMAKERS

ALLIED-SIGNAL:

OUT THE MANIA

S CHARGE

D FORMING

JANUARY 17, 1986 VOL. 229, NO. 2

IRON AGE
MANUFACTURING MANAGEMENT

Editorial 7
Can unions stage a comeback?

Newswatch 14
GMF is becoming the IBM of computer-integrated-manufacturing.

Machine Tool Report 22
Laser cutting may be a bright spot in 1986.

You and Your Job 23
Mobile units provide on-site health screening for employees.

Corporate Cultures 24
The Big 3 automakers are redesigning their organizations.

Allied Signal 33
An automotive/aerospace merger without the mania.

Forming 40
Quality takes charge in forming and stamping.

Alcoa 44
Alcoa tracks Materials 2000.

Applied Intelligent 48
The machine visioncompany stretches the boundaries of machine vision.

Technically Speaking 49
Fuel cell will use exotic materials.

Materials Report 61
The new year brings a renewed optimism to the steel industry.

Price Trends 65
Cooled prices could last through this year.

Order Trends 68
Orders for capital goods look shakey.

Next Issue: A close look at new cutting tool materials.

Departments

LETTERS 8
EDITORIAL STAFF 11
INDUSTRIAL BRIEFS 20
PRODUCT & EQUIPMENT REVIEW 50
FREE LITERATURE 56
PERSONNEL TOUCH 57
AD INDEX 58
BUSINESS STAFF 58
MANAGEMENT SERVICE CARD 59
P&P DATA 12/30 63
FERROUS SCRAP 12/30 64
CLEARING HOUSE 66

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$42 one year, $85 Canada, Foreign (24 issues). Metalsproducer edition—$30 one year, $56 Canada, Foreign (12 issues). Single copies: $3.00. Cable: Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077

Chilton
ONE OF THE ABC PUBLISHING COMPANIES

WINDS OF CHANGE SWEEP THE BIG THREE AUTO MAKERS

GENERAL MOTORS

World Headquarters

GM, Ford and Chrysler are working to develop innovative, entrepreneurial cultures that can respond quickly to changes in the market.

BY BRYAN H. BERRY

America's Big 3 automakers are redesigning their corporate cultures. The goal of the more streamlined organizations is to develop innovative, entrepreneurial cultures quick to respond to changes in the market. Such cultural revolutions are essential for General Motors, Ford, and Chrysler to remain world-competitive.

The auto industry's large size and past success have encouraged inertia. General Motors, the largest U.S. manufacturing company in any industry, has 750,000 total employees. Getting three-quarters of a million people to aim at the same targets at the same time is difficult, perhaps impossible.

In the past, General Motors executives felt that any automotive technology worth looking at already had to be somewhere in GM. Now that inward-looking self-centeredness has given way to a new enthusiasm about looking outside the corporation for technology or processes that can be transferred into GM.

In January 1984 General Motors began the reorganization of the corporation into two car groups, Chevrolet-Pontiac-Canada (C-P-C) and Buick-Oldsmobile-Cadillac (B-O-C). This effectively transferred power within GM to the two new car groups—and away from the old car and component divisions.

Before 1984, work on a vehicle was split up between the different car and component divisions. Hydramatic, for example, did the transmission, Fisher Body the body, Chevrolet the engine, and the Assembly Division the actual assembly of the car. Now, however, product development teams (PDTs) in the new car groups gather design and manufacturing engineers, purchasing agents, and GM and outside suppliers into groups that develop each major car part from start to finish. Fifty to sixty PDTs are assigned to each major new vehicle. The old car divisions now handle primarily just marketing and sales.

The man at the center of the reorganized GM is Lloyd E. Reuss, the vice president and group executive of the C-P-C group. C-P-C's ambitious goal is to increase GM's penetration into the entry-level and under-35-year-old markets. That market segment—largely subcompact and compact cars—is where the imports have been most successful so far. Stiff competition has forced bigger changes at C-P-C than at B-O-C.

Product Development Teams

The two great virtues of the new PDTs are:

—Experts from the different disciplines work together to plan the project from the beginning, and

—Responsibility for making decisions now rests much lower in the organization than before.

In the old organizations, a design engineer would design an engine part, for example. His design would be passed up through three or four levels in the design hierarchy. Then the design would be passed—with modifications, usually—to manufacturing and purchasing, where the same game of passing the blueprint up the organizational chart would be played. Too often the managers at each level would go over the original design engineer's work, check all the calculations, add a few touches—and then take credit for the work. That's a surefire way to kill young engineers' interest in creativity and innovation.

The advantage of GM's old approach was that so many people looked at each design that many potential problems could be spotted before production. The great disadvantage was that it produced some unwieldy compromises for which no one had to take responsibility.

Before 1984, the first time all the designs of the car and component divisions came together for an overall review was, incredibly, at the desk of the GM president. Now the work of the 50 or 60 PDTs is reviewed by the program manager. At C-P-C the program managers, who have responsibility for the program, report directly to Mr. Reuss. Mr. Reuss reports to Alexander A. Cunningham, executive vice president of GM's North American Automotive Operations. He, in turn, reports to GM President F. James McDonald. Besides giving monthly reports of the PDTs' work to Mr. Reuss, the program managers also make quarterly reports to Mr. McDonald.

Each PDT has been assigned targets for piece-cost, investment, and quality. As the program manager assesses the work of the PDTs, and then Mr. Reuss, Mr. Cunningham, and Mr. McDonald assess the program manager's program, they look at the overall program, not at specific sourcing or design decisions.

Another big problem with GM's old organization was interdivisional rivalry. Each division wanted to do the most work and receive the most credit for new projects. Now people from those old divisions work together on the PDTs.

Before 1984, GM's component divisions were the source of most of the corporation's profits.

The car divisions felt duty-bound to buy, for example, transmissions from Hydramatic; and Hydramatic, to buy castings from Central Foundry. The car divisions sometimes would pay these component divisions higher prices than they would outside suppliers—and sometimes would accept lower quality.

"That was wrong," said David E. Cole, director of the Office for the Study of Automotive Transportation at the University of Michigan. "That system distorted the objectives of the corporation away from where they should have been. The real profit centers should be where the highest value is added to the product: the finished vehicles."

That old buddy-buddy system of purchasing parts from GM divisions is breaking down. The PDTs are willing to buy parts from outside vendors—and award them long-term contracts to make capital investments worth their while. The new openness to outside vendors is forcing the GM component divisions to improve their competitiveness in cost and quality. GM's Central Foundry, for example, is modernizing several foundries and plans to sell more castings to customers outside GM, which now accounts for 85 pct of Central Foundry's orders.

Looking Outside GM

C-P-C has begun an Organizational Competitiveness Program (OCP), which looks at the quality, cost, and timeliness of competing automakers all over the world. "We've always looked at the competition's end-products," C-P-C's Mr. Reuss told *Iron Age* in an interview last month. "Now we're comparing our whole organization with the competition's. How do our fabrication, assembly, sales, and finance units stack up versus the competition's? When I visit a C-P-C plant, I ask them how they compare with the competition and what their plan is to beat it."

The most obvious sign of GM's new openness to outside technology is its growing number of joint ventures and acquisitions of outside firms. Leading examples are GM's $5 billion purchase of Hughes Aircraft and $2.5 billion buy of Electronic Data Systems (EDS). The No. 1 automaker also has 50/50 joint ventures with Toyota in New United Motor Manufacturing, Inc., (NUMMI) and with Fanuc in GMF Robotics. Besides this impressive array, GM has minority stakes in several machine-vision and artificial-intelligence companies—and also in Japanese vehicle companies Isuzu and Suzuki.

Forging links between GM and these companies is no easy matter. The small machine-vision companies, for example, have been overwhelmed by hordes of visitors from GM eager to learn all about vision technology. Even NUMMI has felt the need to restrict the flow of visitors from GM. The danger is that a giant like GM can wring all the entrepreneurial, innovative juices out of the smaller firms.

EDS presented another problem. The Dallas-based computer company has a dynamic corporate culture largely modeled on its hard-driving founder and chairman, H. Ross Perot. Mr. Perot gained renown by organizing missions to rescue soldiers missing in action in Southeast Asia and EDS employees stuck in Iran when Ayatollah Khomeini took over. Some GM employees transferred to EDS resent the gung-ho, we're-the-best *esprit de corps* at EDS. More tangibly, the EDS benefits aren't as good as those at GM.

But EDS has a certified entrepreneurial spirit, and GM Chairman Roger B. Smith has given EDS the job of linking GM operations so that paper becomes obsolete at GM. The problem is: EDS people know next to nothing about carmaking. Fusing EDS and GM will require a lot of plain talking and explaining.

The problems of merging EDS and GM are rivaled by the confusion of reorganizing GM itself into the two car groups. "A lot of people at GM hardly even know who their boss is," one supplier told *Iron Age*. "They don't know if or where they'll be moved. GM is in such a state of flux right now that it's hard to get decisions out of some of their people." Sometimes even finding GM employees' phone numbers is difficult, particularly on days when the reorganizing corporation assigns them new phone numbers or offices or even buildings.

GM's Visionaries

The men behind this massive reorganization and cultural revolution are GM Chairman Smith and President McDonald, two down-to-earth, plain-spoken Midwesterners who spurn pretentious talk about how they're making history.

"We need a whole new way of coming at the car," Mr. Smith told the press in 1982. The next year he told *Iron Age*: "We've got to have a new way, but I don't know how it's going to turn out. I'm not an engineer. There may be some squeeze-it-out-of-the-toothpaste-tube design."

In such straightforward talk Mr. Smith outlines his mind-blowing ideas about forgetting everything we know and sitting down before a clean sheet of paper with an open mind. The GM chairman's great strength is that he's willing to risk billions on the ingenuity of GM employees—even though he doesn't know how it will turn out. Mr. Smith has the kind of inspiring naivete

SATURN
CORPORATION

At the helms of the Big Three are (top) GM's Chairman Roger Smith and President F. James McDonald with the prototype Saturn car; Ford President Harold Poling and Chairman Donald Petersen (center); and (bottom) outspoken Chrysler Chairman Lee Iacocca.

that enables him to say: Why not? to things never thought of before.

Mr. Smith put his clean-sheet small car in a separate corporation, Saturn, for some tangible and intangible reasons. Separate from GM, Saturn Corp. won a better labor contract from the United Autoworkers than did the rest of GM. Saturn also is spared the expense of sharing GM's corporate overhead.

But less tangibly, Saturn was set up as a separate corporation to encourage a more innovative corporate culture than at GM. For Saturn's president, GM executives chose Joseph J. Sanchez, "a man who didn't have GM stamped all over him," as Dr. Eugene E. Jennings, professor of management at Michigan State University, put it. Mr. Sanchez was a Latin-American born in New York City who spent most of his GM career in South America. But he died last January, two weeks after his appointment as Saturn president.

The plastic-bodied Fiero (top) gave Pontiac a new identity and GM a shot in the arm. Ford pioneered aerodynamic styling in its Tempo/Topaz and now (center) Taurus/Sable models. Chrysler's K-cars, like the Plymouth Reliant (bottom), saved the corporation.

His replacement, William E. Hoglund, was the Pontiac general manager who encouraged Pontiac engineers to develop the innovative plastic-bodied Fiero sports car. The development of the Fiero is a good example of where GM wants to go. Mr. Hoglund gave a team of engineers the freedom to come up with something new. Saturn is a $5 billion version of that approach.

An entrepreneurial corporate culture also is necessary for GM to accomplish its longterm strategy of diversifying into more nonautomotive businesses. " 'To be the world's leader in all technologies appropriate to us'—that is GM's stated goal in the worldwide technology race," states the first sentence of GM's 1984 annual report. In defense, electronics, financial services, robotics, machine vision, and artificial intelligence, GM wants to come up with the most efficient manufacturing techniques. General Motors will become a General Manufacturing with perhaps a third or more of its sales coming from products besides vehicles by the year 2000.

These visions are attractive enough. "But Roger Smith is taking one big risk," points out Dr. Jennings, "because General Motors has not proved in the past ten years that it is an efficient producer of top-quality, reliable automobiles. If GM is trying to do too much too fast, that will hinder it from becoming competitive with the Japanese."

Eighteen Meetings

One great advantage of GM's big size is that every new product doesn't have to be an instant success. The company's J cars, such as the Chevrolet Cavalier, sold poorly when they were introduced in spring 1982. But the corporation stuck with the cars and modified them. Now the Cavalier is the top-selling car in the U.S.

The problem with the J cars was that GM conceived them in the late 1970s, when fuel economy was consumers' top concern. By spring 1982, however, gasoline prices had stabilized and consumers were as interested in performance as in gas mileage. Customers thought the J cars had too many costly accessories as standard equipment and not enough horsepower.

"GM is a very slow and steady corporation," commented one metalproducing executive who supplies the Big 3. "It moves purposefully. Other automakers—Chrysler especially—gyrate wildly. When Chrysler has problems, it pounces on new solutions."

Another supplier, in a materials-management company, spoke with some irritation about GM's purposefulness. "GM decides on its material-handling system four or five years before beginning production," the executive said. "A snowball develops that can't be stopped."

GM, he added, orders equipment so far in advance that even when better equipment comes along it sticks with the original order.

"GM is still burdened with an enormous internal structure that has to be streamlined," said Mr. Cole.

The No. 1 automaker, Mr. Reuss explained, is taking a "pro-active approach" to reducing its workforce, mainly through attrition and early retirements. "For today's capacity and sales," said Mr. Reuss, "we've got to have fewer people."

Prime candidates for early retirement are GM employees who subscribe to the old way of doing business. "There are still some employees at GM who think we can't learn anything from the Japanese," said Alex C. Mair, GM vice president and group executive of technical staffs. "We need to identify these people and phase them out."

The same goes for managers who resist GM's participatory-management approach, Quality of Work Life (QWL). "There is no place at GM for the executive who calls a meeting and says, 'Hey, guys, we're going to start quality circles on Monday, and you better have results by Friday or you're in trouble,' " explained Mr. Cole.

To drive the point home, GM has reduced or eliminated standard cost-of-living wage increases to many salaried employees. Instead, GM is using that money to award merit increases based on quality and return on investment.

The saying in the auto industry is: "It takes 18 meetings at GM to get a decision out of GM; nine at Ford; and four at Chrysler." Those figures certainly aren't exact, but the point is correct: GM is the slowest-moving of the Big 3, Chrysler the fastest, and Ford somewhere in between.

The good thing about a company as big as GM, Mr. Cole points out, is that it can nurture ideas that take time to develop. In smaller companies, new ideas can get shot down before they have time to grow.

The bad thing about GM's size is that good ideas, however well nurtured, can also get lost between the cracks. One of the most common complaints from advanced manufacturing engineers at GM's Technical Center is that they can't get GM manufacturers to use their ideas. Mr. Cole tells of driving a GM mini van "that was almost the spitting image of the Chrysler product—and GM had it 12 years ago. They just didn't feel it was quite the right time to introduce it." Chrysler introduced its Caravan/Voyager mini vans in fall 1983—and had a smashing success. Only in 1985 did GM finally come out with its Chevrolet Astro mini van.

Fear of Dying

Chrysler's corporate culture remains driven by the memory of its brush with bankruptcy and death. That is a great advantage to Chrysler: Its managers often speak of the camaraderie developed during months of "living in the trenches together," as Chrysler Motors Chairman Gerald Greenwald puts it.

"Chrysler must maneuver skillfully to be first in getting its products to the market," said an executive at a plastics company that supplies Chrysler. "That means they must be skilled at listening to what the market wants."

Chrysler must not only be first with each new product—but also must make sure that each new product is a resounding success. "We have to hit a home run every time we're up," said Chrysler Motors President Harold K. Sperlich. "Others can hit singles and doubles and still stay alive."

So far Chrysler's managers have been hitting consistently well. The front-drive Aries/Reliant K car pulled the company through the gloomy days of near-bankruptcy in 1980-81. The mini vans introduced in 1983 were a big success. So were Chrysler's convertibles and turbocharged engines. None of these technologies was new. But Chrysler was the first U.S. automaker to see a market for them. "Of the Big 3, Chrysler is best at seizing opportunities," said C.K. Prahalad, business professor at the University of Michigan. "In contrast, GM focuses on strategic planning."

Chrysler maneuvers faster than GM or Ford. GM takes years to build a new plant. Chrysler simply guts existing facilities: It can't afford the spanking new $500 million assembly plants that GM builds. Once Chrysler decided to build mini vans at its Windsor, Ont., plant, it shut down the plant and converted it to mini-van production in a breathtaking four months.

"You can't say Chrysler is a culture in transition," said Dr. Jennings. "It's a culture in the making. The winds of crisis erased the imprints of the executives before Mr. Iacocca."

The personality of Chrysler Chairman Lee A. Iacocca pervades Chrysler more than those of the Big 2 chairmen do their companies. Chrysler employees are grateful to him for saving their company. Many hang his picture on their office walls.

"Lee is a tremendous hands-on manager," said Dr. Jennings. "He's great at identifying a market niche and plugging it with a well-designed car. And he's a marvelous salesman.

"But he's not a visionary. His temperament is much better suited to rescuing Chrysler than to building a future for the company."

On the other hand, Dr. Jennings points out, it may be impossible for a Chrysler executive to sit back and dream up a future Chrysler the way Roger Smith is doing at GM. Chrysler simply doesn't offer its leaders the security that GM offers Mr. Smith, a security that greatly aids creative planning.

Some analysts doubt that Chrysler can remain an integrated carbuilder over the long term. The company already buys 70 pct of its parts

BIG THREE'S WORLDWIDE SALES

Total Vehicle Sales (millions of units)

	General Motors	Ford	Chrysler
U.S. and Canada	6,502	3,318	1,966
Rest of World	1,754	2,349	68
Total	8,256	5,667	2,034

Total Sales ($ billions)

	General Motors	Ford	Chrysler
Automotive	81	48	20
Nonautomotive	3	4	—
Total	84	52	20

Source: Annual reports. All figures are for 1984. Vehicle sales include cars, trucks, buses, and tractors.

from outside suppliers; GM buys 35 pct from outside. "Chrysler could easily stop manufacturing engines and move toward becoming just an auto assembler," said one.

The No. 3 automaker must respond quickly. Chrysler executives, for example, vigorously opposed the end of the voluntary restraint agreement (VRA) limiting Japanese imports. They also took legal action against GM and Toyota's joint venture, NUMMI. But once the VRA was dropped, Chrysler immediately announced plans to import even more Japanese cars from Mitsubishi and to form its own joint venture with Mitsubishi.

"We had Plan A and Plan B," said Mr. Sperlich. "With the end of the VRA, we went with Plan B as fast as we could."

Of the Big 3, Chrysler has by far the fewest layers of management. Suppliers have to deal with far fewer people at Chrysler than at GM or Ford, and they're more likely to become personally acquainted with the Chrysler people. Suppliers to Chrysler even find themselves invited to meetings at which such higher-ups as Mr. Sperlich speak. That would be quite unusual at GM.

GM Group Executive Lloyd Reuss is overseeing the reorganization of GM at the Chevrolet-Pontiac-Canada (C-P-C) group.

People at Ford

All the Big 3 now are putting tremendous emphasis on tapping their employees' brainpower through participatory management. This is a big change from the past at Ford.

"For a long time Ford has been dominated by personalities at the top of its corporate structure," said Dr. Jennings. Starting with founder Henry Ford and continuing through his grandson Henry Ford II, Ford chairmen have kept most of the company's power in the hands of their corporate staff.

"Ford Motor was a fiefdom under Henry Ford II," said Mr. Cole. "Everybody on the corporate staff had a tremendous fear of not doing things the way Henry liked them. That was one reason that Henry Ford II eventually removed himself." He now sits on Ford's board of directors.

On the other hand, "the typical Ford employee has a certain pride in being associated with a company founded by a family as impressive as the Fords," points out John B. Stewart, Ford's manager of education and personnel research. Henry Ford was the Great Man of the auto industry's founding fathers. Though the Ford family has taken a lower profile in Ford Motor's affairs, the family's aura has engendered mostly good will in company employees.

Ford's present top managers, Chairman Donald E. Petersen and President Harold A. Poling, are deeply committed to the team approach to management. As president, Mr. Petersen one day was touring the Ford design studios and happened to ask the designers whether they liked the designs they were working on. No, they said. They felt they were designing cars to look the way somebody else wanted them to look, not the way they'd like.

Design cars the way you'd like them to look, Mr. Petersen told them. The result was aerodynamic styling whose rounded corners distinguish Ford's Tempo/Topaz, Thunderbird/Cougar, and now Taurus/Sable. Just as important, the aero look has given Ford employees a sense of identity, something tangible they can point to that sets their company apart.

Ford management also believes that "technology alone isn't the answer," as Mr. Poling puts it. "Carbuilding starts with the people and the process," he says. "Then you look at the technology." Ford is slower than GM to rush out and buy the latest unmanned whizbang.

Mr. Petersen proudly calls himself a disciple of W. Edwards Deming, the originator of statistical process control (SPC). The Ford chairman has lionized the 85-year-old statistician in a videotape widely circulated throughout Ford. Mr. Deming is a frequent visitor to Ford.

"We have improved our union and employee relations substantially," states the 1984 Ford annual report, "and have, we believe, the best such relationships in the domestic industry."

That boast probably is true. Ford has avoided a general workers' strike since 1977. GM workers struck in September 1984; Chrysler workers struck briefly last October.

In 1982 Ford devised an innovative labor contract that gave workers greater job security in exchange for modest pay hikes. GM patterned its contract that year on Ford's.

"There's a lot more mutuality in goal setting at Ford," explained Mr. Stewart. "Ford traditionally managed by objectives, but those objectives usually were set by managers."

The company still is burdened by too many levels of management. It has 384,000 total employees now but plans to cut the salaried ranks by 20 pct by 1990.

Throughout the Big 3, the tasks of reorganizing, cutting the workforce, and streamlining the corporate culture can disrupt many work days of many employees. But most support the changes.

At the Big 3, "there is a general satisfaction among employees with their top leadership," said Mr. Cole. "This is unusual. Several years ago, there was very open criticism of top management at all the companies. Today there's a rather high level of *esprit de corps* at all three companies. That's a very good sign." ☐

PRICE & PRODUCTION DATA

(Effective December 30,1985)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	157	158	173	120
Pittsburgh	149	177	209	115
Youngstown	81	80	96	62
Lake Erie	107	111	130	94
Detroit	129	135	144	133
Chicago	454	425	497	344
Cincinnati	66	86	83	77
St. Louis	65	58	71	48
Southern	166	193	213	131
Western	67	69	81	61
U.S. Production	1,441	1,492	1,697	1,185

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8/13/85. **59.4¢—Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢—U.S. Steel as of 8/16/85. 86.9¢—Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs, 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective December 30,1985)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,441	1,492	86,711	89,888
Capability Utilization Rate	56.6	58.6	65.4	67.0

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	27.582
Pig Iron** (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	$ 72.17	$ 70.50	$ 68.83	$ 80.17
No. 2 bundles	$ 51.17	$ 50.50	$ 50.50	$ 51.50

Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 72.50	$ 72.50	$ 69.50	$ 83.50
No. 1 steel, Philadelphia	71.50	69.50	67.50	76.50
No. 1 steel, Chicago	72.50	69.50	69.50	80.50
No. 1 bundles, Detroit	67.50	66.50	59.50	70.50
Low Phos., Youngstown	71.50	69.50	66.50	72.50
No. 1 mach'y cast., Pgh	68.50	68.50	68.50	66.50
No. 1 mach'y cast., Phila	91.50	91.50	91.50	98.50
No. 1 mach'y cast., Chi	104.50	97.50	97.50	110.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective December 30,1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	48.60	49.53	12/30/85
Copper (C)	66.50-69.00	66.00-69.00	12/27/85
Lead	18.50-19.50	18.25-19.50	12/16/85
Magnesium Ingot	153.00	148.00	12/ 9/85
Nickel (LME)	183.38	195.46	12/30/85
Zinc	35.00	38.00	11/ 6/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.25-1.50
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$327.05
Indium, dollars per troy oz.	$2.50
Iridium, dollars per troy oz.	$430.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb. f.o.b. N.Y.	$320.00-330.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.00-3.13
Nickel electro (PDCR)	$3.29
Palladium, per troy oz.	$95.50
Platinum, per troy oz.	$340.00
Rhodium, per troy oz.	$1,125.00
Silver ingots, per troy oz.	$5.865
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.00-9.50
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

Dec. 23—TRADING
Dec. 24—SUSPENDED
Dec. 25—
Dec. 26—
Dec. 27—

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	61	52
Yellow brass	51¾	45¼
Red brass	56⅛	48¾
Comm. bronze	57¾	49¾
Mang. bronze	43	42
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	58
No. 2 copper wire	50
Light copper	41

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	54
No. 2 copper wire	46
Light copper	37
No. 1 composition	47
No. 1 comp. turnings	46
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	27
Radiators	36

Aluminum

New mixed clips	33	— 34
Old sheet	30	— 31
Old cast	30	— 31
Clean dry borings	31	— 32

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	24	— 26
Mixed L.C. clips	21	— 22
Old sheets and cast	20	— 21
Borings and turnings	16	— 18
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 39
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 15

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 17
Old diecast zinc	11	— 13

St. Louis price reporting change

Effective Jan. 6, *Iron Age* will revise scrap prices reported for the St. Louis market to align its prices with those paid by the consumers in that region. For some of the grades in that market, the actual market prices may not change as much as the *Iron Age* prices will.

For additional information, contact Michael Marley, Managing Editor, Iron Age, Chilton Co., Chilton Way, Radnor, Pa. 19089.

EFFECTIVE DECEMBER 30,1985

(Effective December 30,1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	90.00 to	91.00
No. 1 factory bundles (auto)	90.00 to	91.00
No. 2 bundles	49.00 to	50.00
No. 1 busheling	88.00 to	89.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	42.00 to	43.00
Low phos. punchings plate	97.00 to	98.00
Heavy turnings	63.00 to	64.00
No. 1 RR hvy. melting	79.00 to	80.00
Rails, 2 ft. and under	102.00 to	103.00
Scrap rails, random lgth	76.00 to	77.00
RR specialties	95.00 to	96.00
No. 1 machinery cast	68.00 to	69.00
Cupola cast	61.00 to	62.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	515.00 to	525.00
18-8 turnings	415.00 to	425.00

Chicago

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	65.00 to	66.00
No. 1 dealer bundles	90.00 to	91.00
No. 1 factory bundles (auto)	91.00 to	92.00
No. 2 dealer bundles	58.00 to	59.00
No. 1 busheling	84.00 to	85.00
Shredder scrap	85.00 to	86.00
Machine shop turnings	38.00 to	39.00
Mixed borings and turnings	40.00 to	41.00
Shoveling turnings	42.00 to	43.00
Cast iron borings	45.00 to	46.00
Low phos. forge crop	97.00 to	98.00
Low phos. punchings plate 1/4 in. and heavier	112.00 to	113.00
Low phos. 2 ft. and under	107.00 to	108.00
No. 1 RR hvy. melting	84.00 to	85.00
Scrap rails random lgth	82.00 to	83.00
Reroller rails	105.00 to	106.00
Rails, 2 ft. and under	103.00 to	104.00
RR couplers and knuckles	90.00 to	91.00
RR car axles	103.00 to	104.00
No. 1 machinery cast	104.00 to	105.00
Cupola cast	90.00 to	91.00
Stove plate	92.00 to	93.00
Steel car wheels	90.00 to	91.00
Stainless		
18-8 bundles and solids	500.00 to	510.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	130.00 to	135.00
430 turnings	95.00 to	100.00

Philadelphia

No. 1 hvy. melting	$ 70.00 to	$ 73.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	83.00 to	86.00
No. 2 dealer bundles	44.00 to	47.00
No. 1 busheling	82.00 to	85.00
Shredder scrap	82.00 to	85.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	73.00 to	76.00
Low phos. 2 ft. punchings	94.00 to	97.00
Electric furnace bundles	88.00 to	91.00
RR specialties	73.00 to	76.00
Rails, 2 ft. and under	98.00 to	101.00
Cupola cast	78.00 to	81.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	90.00 to	93.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	67.00 to	68.00
No. 2 bundles	25.00 to	26.00
No. 1 busheling	66.00 to	67.00
Drop forge flashings	40.00 to	41.00
Machine shop turnings	31.00 to	32.00
Mixed borings and turnings	12.00 to	13.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	17.00 to	18.00
Heavy breakable cast	33.00 to	34.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	460.00 to	470.00
18-8 turnings	345.00 to	355.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 60.00 to	$ 61.00
No. 2 hvy. melting	55.00 to	56.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 dealer bundles	36.00 to	37.00
Machine shop turnings	22.00 to	23.00
Shoveling turnings	22.00 to	23.00
Low phos. plate	71.00 to	72.00
Electric furnace bundles	61.00 to	62.00
Galvanized bundles	59.00 to	60.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	79.00 to	80.00
No. 1 factory bundles	59.00 to	60.00
No. 2 bundles	35.00 to	36.00
No. 1 busheling	69.00 to	70.00
Machine shop turnings	24.00 to	25.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	17.00 to	18.00
Cut structural & plates, 5 ft. and under	68.00 to	69.00
Cut structural & plates, 2 ft. and under	86.00 to	87.00
Low phos. punchings plate	86.00 to	87.00
Foundry steel, 2 ft. & under	53.00 to	54.00
No. 1 RR hvy. melting	58.00 to	59.00
Rails, 2 ft. and under	87.00 to	88.00
Rails, 18 in, and under	89.00 to	90.00
No. 1 machinery cast	77.00 to	78.00
Mixed cast	44.00 to	45.00
Stainless		
18-8 bundles	445.00 to	455.00
18-8 turnings	330.00 to	340.00
430 bundles	100.00 to	110.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 busheling	67.00 to	68.00
No. 1 dealer bundles	67.00 to	68.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	15.00 to	16.00
Mixed boring and turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	23.00 to	24.00
Low phos. plate	74.00 to	75.00
Structural and plate, 2 ft. and under	79.00 to	80.00
Rails, 2 ft. and under	79.00 to	80.00
Scrap rails, random lgth	64.00 to	65.00
No. 1 machinery cast	79.00 to	80.00
No. 1 cupola cast	60.00 to	61.00

St. Louis

No. 1 hvy. melting	$ 49.00 to	$ 50.00
No. 2 hvy. melting	36.00 to	37.00
Foundry steel, 2 ft.	43.00 to	44.00
No. 1 dealer bundles	49.00 to	50.00
No. 2 bundles	33.00 to	34.00
Machine shop turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	53.00 to	54.00
Rails, random length	59.00 to	60.00
Rails, 18 in. and under	72.00 to	73.00
RR specialties	70.00 to	71.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	89.00 to	90.00
Steel car wheels	81.00 to	82.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	64.00 to	65.00

Birmingham

No. 1 hvy. melting	$ 68.00 to	$ 69.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	68.00 to	69.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	68.00 to	69.00
Shredder scrap	84.00 to	85.00
Machine shop turnings	24.00 to	25.00
Shoveling turnings	38.00 to	39.00
Cast iron borings	37.00 to	38.00
Electric furnace bundles	64.00 to	65.00
Elec. furnace, 3 ft. & under	64.00 to	65.00
Structural and plate, 2 ft.	86.00 to	87.00
Structural and plate, 4 ft.	81.00 to	82.00
No. 1 RR hvy. melting	81.00 to	82.00
Scrap rails, random lgth	69.00 to	70.00
Rails, 2 ft. and under	85.00 to	86.00
Angles and splice bars	81.00 to	82.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	74.00 to	75.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	15.00 to	16.00
Low phos. 18 in. and under	79.00 to	80.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	74.00 to	75.00
No. 1 cupola cast	59.00 to	60.00
Heavy breakable cast	24.00 to	25.00
Drop broken cast	71.00 to	72.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	445.00 to	465.00
18-8 turnings	340.00 to	365.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	17.00 to	19.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	11.00 to	12.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 81.00
No. 2 hvy. melting, cut 2 ft. and under	70.00
No. 1 dealer bundles	86.00
No. 2 bundles	61.00
Mixed steel scrap	59.00
Bush. new fact. prep'd	81.00
Bush. new fact. unpro'd	64.00
Machine shop turnings	34.00
Short steel turnings	34.00
Mixed borings and turnings	19.00
Cast scrap	89.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	54.00 to	55.00
No. 2 bundles	40.00 to	41.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	30.00 to	31.00
Shredder scrap	74.00 to	75.00
Cut structural plate, 2 ft. and under	97.00 to	98.00
Cut structural plate, 5 ft. and under	79.00 to	80.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	83.00 to	84.00

COOLED PRICES COULD LAST THROUGH 1986

If U.S. industry is not buying at a hot pace these days, it is certainly not high and rising prices that are to blame. Prices of finished goods at the producer level rose only 1.5 pct between November of 1984 and the same month last year—the latest month of complete price data.

The soft price situation is reflected in the table here listing 22 key metalworking product lines. In November, prices for seven product lines actually decreased from October. Four showed no price changes at all, and six had price increases of only 0.1 pct. In other words, some 17 out of 22 product lines showed little or no month-to-month price pressures in November.

In the two-month period of October and November, overall finished goods prices rose more sharply than in any similar period over the past near-three years. In October, these prices rose by 0.9 pct, and in November, they rose by 0.8 pct. However, U.S. Labor Dept. analysts pointed out that these jumps were due entirely to sharp rises in prices of energy goods and foods. Energy prices rose by 3.1 pct in November; food prices by 1.6 pct—a pace not expected to continue.

A number of economists are now predicting an even softer price scenario for this year compared to 1985. One economist, Pierre Rinfret noted that, "OPEC's decision to meet the price cuts of non-OPEC oil producers means further declines in both interest rates and inflation in 1986."

The record shows that since 1981, the declining price of oil has gone hand-in-hand with declines in inflation and interest rates.

Clearly, it can be said that if ever there was peace on the price front it is right now. And it looks like there will be more of the same through most, or all, of this year.

Latest Month Covered: November 1985

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	396.0	+ 0.1	+ 0.6
Metal Forming Machine Tools	433.2	0	+ 1.4
Agricultural Machinery & Equip.	337.8	+ 0.1	+ 0.2
Construction Machinery & Equip.	363.5	+ 0.1	+ 1.6
Industrial Process Furnace & Ovens	392.2	+ 0.8	+ 3.3
Industrial Material Handling Equip.	294.6	+ 0.1	+ 1.1
Pumps, Compressors & Allied Equip.	359.5	+ 0.3	+ 1.8
Fluid Power Equip. (Dec. 1970 = 100)	265.4	+ 0.2	+ 1.5
Mechanical Power Transmission Equip.	339.0	— 0.4	+ 2.6
Automobiles	234.6	— 0.1	+ 4.5
Motor Trucks—Light	312.6	+ 0.1	+ 7.5
Motor Trucks—Heavy	335.1	— 0.7	+ 1.1
Railroad Equipment	364.1	— 0.1	+ 1.4
Fabricated Metal Structural Products	315.4	0	+ 0.9
Electric Motors	351.1	— 0.2	+ 2.6
Valves & Fittings (Dec. 1982 = 100)	105.1	+ 0.3	+ 2.2
Ball & Roller Bearings	354.3	— 0.2	+ 2.8
Cutting Tools & Accessories	287.2	0	+ 1.6
Heating Equipment	261.3	— 0.1	+ 2.1
Plumbing Fixtures & Brass Fittings	315.0	+ 0.1	+ 1.9
Metal Containers	358.3	+ 0.2	+ 0.3
Miscellaneous Metal Products	302.4	0	+ 0.3

Data based on U.S. Labor Dept.'s Producer Price Index

ORDERS FOR CAPITAL GOODS LOOK SHAKY

As far as capital goods producers are concerned, October was a bummer. Their orders, including those received by both defense and nondefense goods producers, were down a thumping 11 pct from September.

Much of the October slide in orders for capital goods was due to a 25 pct decline in defense-related orders. Defense orders, of course, are volatile. They may well be up strongly when November data is known. Still, the overall machinery order picture remains lackluster.

As can be seen on the table here, many of the machinery product lines had order setbacks in October.

Notably, there has been no growth thrust in machinery lines for a long time. The U.S. Commerce Dept., in its October report on manufacturers' orders and shipments, noted that shipments of machinery "first reached the $33 billion level in June 1984 and have been relatively stable since then, averaging $33.1 billion per month." In October, shipments of machinery totaled $33.9 billion.

This underlying lack of growth push has led to tight reins being held on inventories. Stocks held by durable goods manufacturers in October declined by $1.5 billion, or 0.8 pct from September. The government report noted, "Every major industry except instruments and lumber decreased."

Further, the decline in stocks occurred in all three stages of fabrication—purchased goods, work in process and finished goods.

Total shipments of durable goods producers have been holding up well. That helps. After all, it is shipments that are invoiced. Shipments of durable goods were up $3.2 billion, or 3.1 pct, in October.

Still, orders shape tomorrow's business and orders during the month fell by $2.2 billion or 1.1 pct.

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted **Source: U.S. Dept of Commerce**		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	4th Qtr*	$387.4	$389.5	$368.3
Manufacturing, Total	4th Qtr*	156.0	157.8	147.0
Manufacturing, Durable Goods	4th Qtr*	74.7	75.8	71.4
Mining Industry	4th Qtr*	15.8	16.3	17.0
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	Oct.	104.4	106.6	96.5
Shipments	Oct.	106.9	103.7	100.8
Inventories	Oct.	198.4	200.1	190.1
Unfilled Orders	Oct.	354.0	356.5	346.0
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	Oct.	27.2	29.2	25.3
Capital Goods Producers Defense Industries	Oct.	6.0	8.1	5.2
Primary Metals, Total	Oct.	10.7	10.2	10.5
Steel (SIC 331)	Oct.	4.6	4.2	4.3
Iron & Steel Castings (SIC 332)	Oct.	1.2	1.3	1.3
Nonferrous Metals	Oct.	4.9	4.7	4.9
Nonelectrical Mach.-Equip. Industries, Total	Oct.	16.6	17.4	16.9
Engines & Turbines	Oct.	1.0	1.2	0.8
Farm Machinery & Equipment (Shipments)	Oct.	0.9	0.8	1.0
Construction, Mining & Mat. Hdlg. Equip	Oct.	2.7	2.8	2.8
General Industrial Machinery	Oct.	1.2	1.5	1.4
Fluid Power Equipment** (Index-1972=100)	Oct.	288.0	265.0	304.0
Metalworking Machinery	Oct.	1.0	1.0	0.8
Machine Tools, Total ($Mill., Unadjusted)***	Oct.	231.6	174.1	283.6
Machine Tools, Metalcutting***	Oct.	158.3	124.1	191.8
Machine Tools, Metalforming***	Oct.	73.3	50.0	91.8
Electrical Mach. & Equip. Industries, Total	Oct.	15.9	16.9	14.9
Elec. Transmission Equip. & Ind. Apparatus	Oct.	2.2	2.0	2.1
Household Appliances	Oct.	1.5	1.5	1.4
Communication Equipment	Oct.	5.4	6.8	5.0
Transportation Equipment, Total	Oct.	26.3	28.1	22.2
Motor Vehicles & Parts (Shipments)	Oct.	17.7	17.3	16.2
Aircraft, Missiles & Parts	Oct.	7.8	9.2	5.2
Shipbuilding & Military Tanks	Oct.	0.3	0.9	0.5
Fabricated Metal Products, Total	Oct.	14.8	14.4	12.3
Instruments, Total	Oct.	4.6	4.6	4.5

*Est.—Commerce Dept; **Source: National Fluid Power Assn.; ***Source: NMTBA.

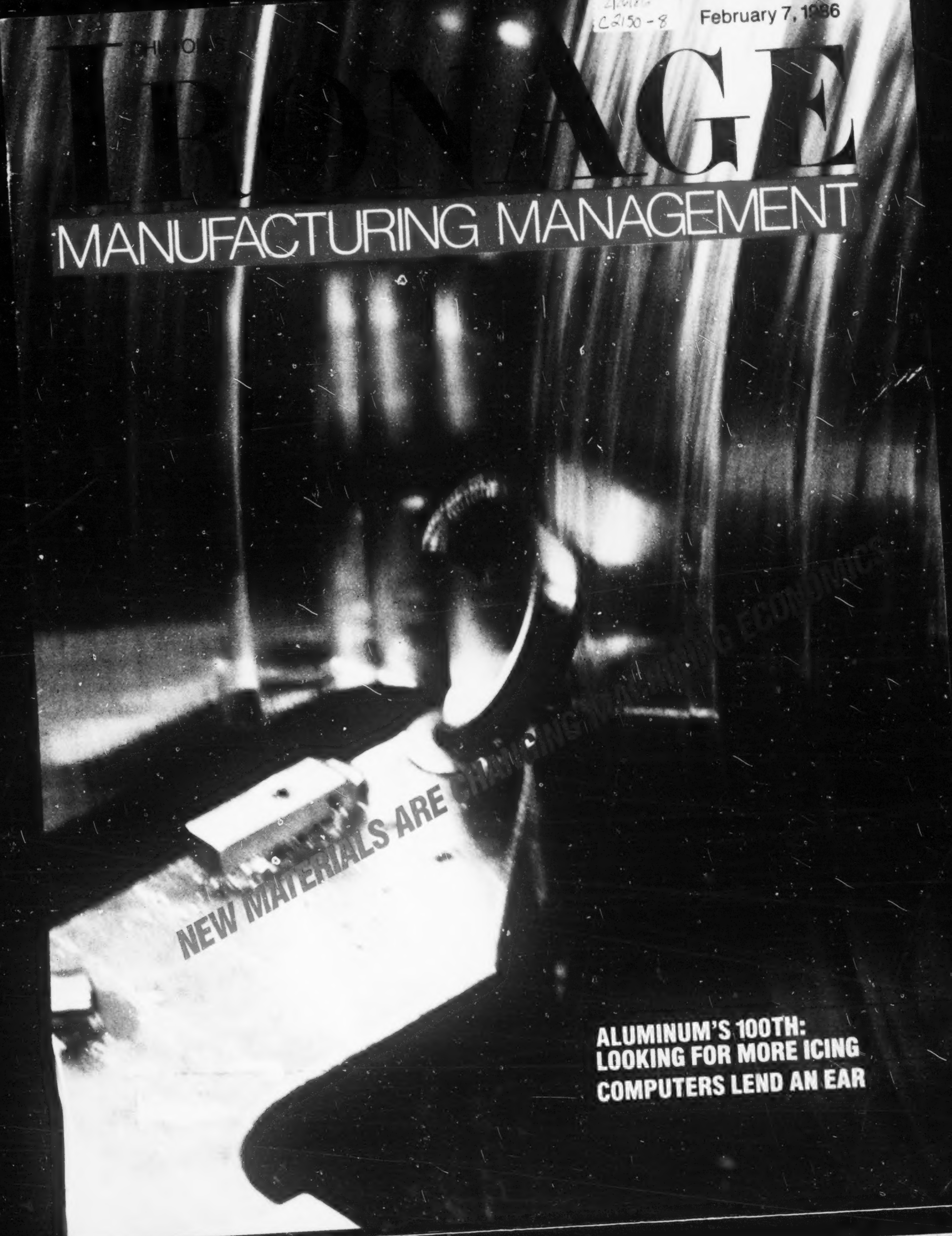
2/26/86
C2150-8

February 7, 1986

CHILTON'S

IRON AGE

MANUFACTURING MANAGEMENT



NEW MATERIALS ARE CHANGING MACHINING ECONOMICS

ALUMINUM'S 100TH: LOOKING FOR MORE ICING

COMPUTERS LEND AN EAR

FEBRUARY 7, 1986, VOL. 229, NO. 3

IRON AGE
MANUFACTURING MANAGEMENT

Editorial 5
Am I off the hook?

Newswatch 13
USS joins the push into steel processing and fabrication.

You and Your Job 19
New program focuses on getting disabled back to work.

Aluminum's 100th 22
The cake is large, but its icing is thin in places.

Cutting Tools 33
New cutting tools change machining economics.

Voice Technology 40
Talking computers fully integrate workers and computers.

Generic Steel 49
One melt fits all—at USS' Gary Works.

Materials Report 57
Imports and the auto market cloud steel's outlook.

Order Trends 68
Orders continue to slip and slide.

Next Issue: America's new superplants

Departments

EDITORIAL STAFF 8
LETTERS 8
INDUSTRY BRIEFS 16
PRODUCT & EQUIPMENT REVIEW 53
AD INDEX 58
BUSINESS STAFF 58
MANAGEMENT SERVICE CARD 59
P&P DATA 1 13 61
FERROUS SCRAP 1 13 63
STEEL PRICES 64
CLEARING HOUSE 66

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is [illegible] to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$[illegible] one year, $[illegible] Canada, Foreign (24 issues). Metalproducing edition: $30 one year, $56 Canada, Foreign (12 issues). Single copies: $3.00. Cable: Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077.

Chilton
ONE OF THE ABC PUBLISHING COMPANIES

Looking for more icing

BY ROBERT REGAN

The birthday cake the aluminum industry cuts this month has 100 candles on it.

The icing on it has grown a bit thin in places, but the cake itself has grown tremendously, particularly in the latter decades of aluminum's first century.

Profit margins have taken quite a battering in the 1980s. But the past several years also have seen many of the producers restructuring and repositioning themselves—at great expense—to repair profitability, credit standing with the banks and financial resources for research and development programs needed to survive in today's high tech markets against stiff intramural and international competition and pressure from other materials.

The birthday party marks the 100th anniversary of the development of a viable process for commercial production of aluminum. The discoverers were Charles Martin Hall in the U.S. and Paul L.T. Heroult, working independently in France, and the result was the elevation of aluminum from laboratory curiosity to workhorse metal.

The birthday won't be without a few ironies. For one, the U.S., home of Hall's process and the first commercial producer, Aluminum Co. of America (nee Pittsburgh Reduction Co.), currently is the scene of substantial shrinking of capacity to produce aluminum.

For another, Alcoa has folded the tents on a 12-year effort to develop an alternative to the Hall process. The closed cell technology used in the Alcoa Smelting Process was said to work well, but the supply system producing the aluminum chloride feedstock was, as former Alcoa Chairman W.H. Krome George once put it, "a plumber's nightmare."

(Alcoa celebrates its centennial in 1988, but this month's shindig on Feb. 23 is one everybody in the aluminum business will be celebrating.)

The aluminum producers put a lot of time and money into boosting the efficiency of the Hall process, along with some imported technology, but the substantial improvement in energy efficiency achieved (which considerably narrowed the gap with the efficiency target of the Alcoa Smelting Process) wasn't enough to offset rising energy costs.

Although the price of oil has been retreating of late, the cartel-propelled price spiral of the 1970s did its damage and competition for low cost hydroelectric power did the rest.

Alumax, Inc., in 1980 started up what is likely to be the last greenfield smelter in the U.S. near Charleston, S.C. Since then, it's been a case of steady contraction and one recent forecast put domestic capacity by the end of 1987 below 3.7 million tons compared with the 5.6 million tons a year on the books at the start of 1985.

Alcoa is starting off the first year of aluminum's second century carrying out plans to slash domestic capacity by 350,000 tons to about 1.22 million tons a year. Reynolds Metals Co., Kaiser Aluminum & Chemical Corp., Revere Copper & Brass, Arco Metals, Conalco and Martin Marietta Aluminum all have either pared capacity or pulled out of aluminum smelting altogether. (One of Martin Marietta Aluminum's two smelters was picked up in 1985 by Commonwealth Aluminum

U.S. ALUMINUM SHIPMENTS BY MARKETS

(In Millions of Lbs.)

	1960	%	1984	%
Building & construction	1,173	24.8	2,856	18.5
Transportation	899	19.0	2,939	19.0
Consumer durables	513	10.8	1,106	7.2
Electrical	528	11.2	1,492	9.7
Machinery & equipment	333	7.0	825	5.3
Containers & packaging	321	6.8	4,038	26.2
Exports	617	13.0	1,076	7.0
Other	348	7.4	1,094	7.1
TOTAL	4,732		15,246	

U.S. ALUMINUM TRADE

(Millions of Lbs.)

	Imports		Exports	
	Ingot	Mill Products	Ingot	Mill Products
1985*	1,850	1,020	820	425
1984	1,945	1,090	572	504
1983	1,637	618	795	446
1982	1,359	456	802	492
1981	1,421	304	688	682
1980	1,161	168	1,429	763
1979	1,142	426	401	622
1978	1,516	484	253	494
1977	1,341	165	196	517
1976	1,151	189	305	516

**IA estimates Sources: The Aluminum Association, U.S. Department of Commerce*

Corp., along with substantial fabricating capacity.

It is in the fabrication and manufacturing side of the business that most of the action will be from here on out. And that's where many of the larger companies, having conceded ground to independents, overseas smelters and the London Metal Exchange, have been placing their big money bets. Even here, they are being chased higher up the value-added tree. That's why hundreds of millions of dollars have been spent acquiring new rolling capacity and modernizing and upgrading the quality of existing rolling facilities in order to keep ahead of the overseas competition.

Can Stock

The main arena over the next several years is the market for can stock, which alone accounts for over a fifth of total U.S. aluminum industry shipments and nearly half total aluminum sheet consumption. It's already the center of a trade row with Japan. Aluminum industry analyst J. Clarence Morrison of Dean Witter Reynolds Inc. has calculated that can stock imports, mainly from Japan, Canada and Australia captured 10 pct of the domestic market last year and that Japan accounted for half of can stock imports.

Is there still room for growth or will the years ahead see the established producers preoccupied with defending turf against newcomers and other materials? Says David P. Reynolds, chairman of Reynolds Metals Co., "In addition to the many untapped and still unknown uses for aluminum that can and will emerge in the years ahead, the industry has another strong basis for anticipated growth. It is the very low per capita consumption of aluminum in most areas of the world outside the U.S. including Eastern Europe, China, Pacific Asia and South America.

"The industry will always be challenged by competing or alternative materials and there is every likelihood that in many future uses of aluminum, it will perform in combination with other materials to do specific jobs."

Mr. Reynolds said he doesn't think the shift of ingot capacity to foreign shores will have a parallel in flat rolled aluminum and other mill products. "One of the major reasons for the U.S. becoming uneconomic in the production of primary aluminum was high energy costs, but in some cases it also was obsolescent facilities. These are not factors in the area of sheet and mill products since our fabricating facilities require relatively insignificant amounts of energy in comparison to primary and there have been and continue to be advances in process technology and automation.

One of the aluminum industry's hopes for its next century is further growth in automotive uses like this all-aluminum driveshaft being installed in a Ford Aerostar mini-van.

"Furthermore, the industry has invested and will invest substantial sums in modernizing its fabricating capacity to achieve higher quality, production and competitiveness. Add to this the expectation that, as per capita consumption increases abroad, there will be less pressure on foreign producers of mill products to ship to the U.S. market.

"We cannot lose sight of the fact that the aluminum industry is an international industry. Despite the current trials and tribulation of North American producers, most other aluminum companies around the world are prospering. Looked at from a global perspective, the aluminum industry is quite healthy, as indicated by the fact that in 1985 we enjoyed another record year for demand, consumption and shipments. We are very optimistic about the outlook for aluminum's second century," Mr. Reynolds said.

Kaiser Aluminum & Chemical Corp., just emerging from a $230 million beefing up of its Trentwood, Wash., rolling mill, said the main goal of the program, which also included the Ravenswood, W.Va. mill to a lesser extent, was "to ward off the loss of sheet and plate business to offshore producers."

"In aluminum's second century," said Kaiser Chairman Cornell C. Maier, "there will be penetration and growth in markets served by other materials. However, because of inroads already made by aluminum, the growth rate will be considerably slower. The niches that will be carved out by aluminum will be more of the exotic type. In an effort to capture some of these markets, research will concentrate to some extent on advanced materials such as aluminum-lithium alloys, primarily for aircraft, aerospace and defense applications; aluminum-lithium powder metallurgy for extrusions and forgings, and metal matrix composites. There will be more and more material combinations, like aluminum and plastic, ceramics and aluminum, and ceramic, plastic and aluminum."

Kaiser Aluminum, which was compelled to grapple with a takeover attempt as it was emerging from its multi-million-dollar modernization program, "is closing in on the goals set for cost reduction in raw material, primary metal and fabricating parts of the business. In addition, we have reduced costs and increased competitiveness through renegotiation of our contract with the United Steel Workers," Mr. Maier said.

On the final day of 1985, Kaiser Aluminum announced it was writing down the value of its Baton Rouge, La., alumina refinery and several smaller assets by $160 million after taxes and will reduce the company's net worth by that amount. The Baton Rouge facility has been idle since 1983.

Alcan Aluminium, Ltd., a short time later announced it would report a $215 million write-down for the fourth quarter of 1985, most of which reflects reduction of the value of bauxite and alumina operations. The company didn't specify which properties were affected. Alcan has bauxite and alumina facilities in Jamaica, alumina refineries in Ireland and Canada, and participates in bauxite and alumina ventures in Spain, Australia and Brazil.

Alcoa's planned 350,000 tons a year cutback in smelter capacity is part of a $175 million fourth quarter writedown that also includes alumina capacity and investment in the Palestine, Tex., plant where the Alcoa Smelting Process was being tested. Alcoa Chairman Charles W. Parry said the company "is restructuring its primary aluminum business to reflect fundamental changes in the structure of the world aluminum industry." He said the move was "part of the company's stated strategy of bringing its consolidated refining and smelting system nearly into balance with the metal needs of our U.S. fabricating system.

"We expect this action to improve the company's cost structure and complement our objective of using advanced technology and higher levels of quality to gain advantage in those parts of the aluminum business that offer the greatest financial rewards."

Alcoa's heavy investments over the past several years have been concentrated on modernization of rolling mills in Alcoa, Tenn., Warrick, Ind., and Davenport, Iowa, and have stressed competitiveness in can stock in particular.

A. Stephen Hutchcraft, Kaiser Aluminum's president and chief operating officer, said the modernization program at Trentwood boosted rolling capacity by 25 pct while cutting conversion costs by about a third. The program, he said, "is Kaiser's ticket to the 21st Century."

Centerpieces in the revitalized 40-year-old plant include two electromagnetic casters and an 80-in. hot mill said to be the only six-high unit in operation anywhere in the aluminum business. One advantage is the extra intermediate rolls to control roll deflection and provide maximum flatness and crown control. Mr. Hutchcraft estimated that the electromagnetic casting units saved the company $10 million in scalping equipment required with conventional casting methods.

Kaiser has two electromagnetic casters operating at Trentwood, a third "in the oven" and a fourth in the planning stage. Next stop? "Electromagnetic casting for the Ravenswood, W. Va. rolling mill—as soon as we can afford it," a Kaiser official said.

Trentwood now is capable of producing about 450 million lbs of flat rolled products a year, a gain of about 13 pct. The mill's reach can be extended another 100 million lbs with the installation of more equipment.

As aluminum starts its second century, Commonwealth Aluminum Corp. is embarking on its second year and sees the aluminum market becoming more selective and more specialized.

"The industry will become more market-driven and market selection will influence plant configuration," said William T. Sullenberger, vice president, marketing and sales. He also said aluminum mills will become specialty mills focusing on markets and products where they feel they can get the best return and "the supplier of all products to all markets will disappear."

Mr. Sullenberger said the "aluminum market made available by the London Metal Exchange has reduced the need for fully integrated complexes. The second century will see partially-integrated producers and fabricators as more the norm."

Even though fundamental change taking place throughout the industry is causing problems for the producers currently, "we believe it is moving in the right direction for consumers because it is moving to lower cost and higher quality aluminum products. And the U.S. sheet producers have consolidated their position as the technological leaders," he said.

The shakeout in the primary sector, while painful to some companies, eventually will prove beneficial as it lowers the cost of the basic material to integrated and independent fabricators alike. The economies, Mr. Sullenberger continued, derive in part from writing off high cost plants in favor of low cost plants. As ingot weighs only a quarter of the bauxite required to produce it (and half the weight of the alumina in cases where that was the raw material transported to the smelter) ingot cost is lower when the smelter is near the raw material source, assuming there is economical energy available as well. Another advantage, Mr. Sullenberger said, is lower labor costs.

More Recycling

The integrated producers, meanwhile, are increasing their recycling operations, thereby reducing both raw material costs and dependence on external sources of primary metal. As for the rolling mills of the future, the Commonwealth Aluminum official said, these will remain situated close to consumers to capitalize on such advantages as shorter lead times and lower inventory requirements. They will be increasingly higher technology, computer controlled plants that will be less labor intensive and able to produce higher quality products.

Alcan Aluminum Corp., U.S. arm of Montreal-based Alcan Aluminium, increased its U.S. position in 1985 by purchasing smelting and fabricating facilities from Arco Aluminum—plus a 40 pct interest in the big Logan County, Ky., rolling mill that will be pressing hard for can stock business this year.

The emphasis on aluminum's biggest single market notwithstanding, the Cleveland-based company's goal for 1990 "is 25 pct of total sales from products or businesses that we are not in today," according to Timothy C. Tuff, who took over Roy Gentles' spot as president in a recent reorganization.

"We see no shortage of opportunities, although most are specialty, high value-added global markets calling for high levels of technical competence," he said.

Mr. Tuff identified aluminum-lithium alloys as an area of particular interest (and one in which Alcan will be bumping noses with Alcoa, Reynolds, Kaiser and other companies including Aluminium Pechiney of France).

"We believe this material will become the major structural material for the next generation of aircraft," he said, adding that while Alcan will be supplying prototype material from its United Kingdom facilities initially, "U.S.-produced material will be available when the volume of demand starts building."

In a recent aluminum survey, the *London Economist* said the significance of aluminum-lithium alloy "is great as a defensive strategy against new carbon fiber products, but it does not seem to be a route toward extra tonnage—unless the product can be price-competitive in many more general applications."

Mr. Parry, Alcoa's chairman, recently observed that aluminum has lost market ground to plastics in the form of graphite fibers and composites over the past five years. "Aluminum-lithium will stem that to some degree and will stop the encroachment of composites into the aerospace market. But Alcoa is also working on composites where there are advantages to using composites, particularly in military applications," he said.

Alcan Aluminum's Mr. Tuff said another opportunity being created for aluminum by the changing market environment—in this case deregulation of rail freight rates—is the drive to offer more efficient rail cars, particularly for hauling coal.

In a joint venture called Tarco (The Aluminum Railcar Co.), Alcan Aluminum and Thrall Car Manufacturing Co. recently completed construction of a prototype rotary dump rail car said to be able to haul 110 tons of coal, 10 pct more than conventional designs can carry.

Alcoa last September calculated that 43 pct of coal cars ordered in the U.S. since 1983 were aluminum. This estimate followed an order by Georgia Power Co. for 600 aluminum coal cars from Ortner Freight Car Co. of Milford, Ohio.

Mr. Tuff said Alcan soon will open a plant at Riverside, Calif., for production of superplastic aluminum alloy composite sheet for use in complex aerospace parts and automotive panels and accessories.

As far as Aluminum Pechiney is concerned, "aluminum always has a future ahead of it. This future is packaging (which will be developed in Europe), it is laminated tubes, it is aluminum-lithium, it is aluminum matrix composites."

And, while primary aluminum capacity may be shrinking in the U.S. where "the management and location strategies for different types of electric power plants have made energy costs quite expensive in areas with a high concentration of reduction facilities, this situation should not be confused with the rest of the world," said G.Y. Kervern, president of the Pechiney Group's aluminum unit.

"France, in particular, benefits from a much more favorable situation in view of the major developments in nuclear energy," he added.

Mr. Kervern also said that the Hall-Heroult Process is being used more than ever and continually improved with new technology, including the 180,000 ampere cell technology developed by Pechiney.

The integrated French producer expects to have its joint venture 230,000 tons a year smelter in Becancour, Que., started up this May. Its partners in the venture, Alumax and the Quebec government, each hold 24.95 pct shares and Pechiney holds 50.1 pct. Becancour uses Pechiney's 180,000-amp cell technology, which the company notes has accounted for one out of every two tons of new capacity brought onstream worldwide since 1980.

Pechiney also is increasing capacity at its St. Jean de Maurienne smelter from 50,000 to 120,000 tons a year with two new potlines employing its 280,000-amp pots.

Start-up of a $40 million aluminum-lithium plant able to produce up to 4,000 tons of slab and billet a year is scheduled for late 1987.

Overseas trade was very much in the mind of Joseph D. Crider, executive vice president of Reliance Steel & Aluminum Co., when he warned at a late 1985 meeting of the National Association of Aluminum Distributors that American industry has been on the defensive to long.

"If our customers in the automotive, machinery, transportation and high tech industries can't compete in the world market, then our customer base is slowly going to shrink and our low cost, subsidized friends overseas will turn us from a front rank industrial economy into a service economy," he said.

The NAAD, of which Mr. Crider is current president, is looking for positive impact on aluminum distributor business this year from growth in the money supply, some reduction in the trade deficit and further devaluing of the dollar. Aluminum distributors account for about 31 pct of industry shipments to markets served by producers and distributors. Commonwealth Aluminum's Mr. Sullenberger has predicted a trend away from mill owned distribution, a trend toward smaller regional chains, more specialization and continuation of open distribution. ☐

COMPUTERS LEND AN EAR

When using a computer in the factory, the entry of data via a keyboard can be slow and awkward. New technologies permit users to bypass the keyboard and speak directly to the computer.

BY ROBERT E. HARVEY

Too often computer installation is accompanied by fear and trembling.

No matter how technically sophisticated computers become, computer-integrated manufacturing (CIM) will remain an unfulfilled promise until computers become tools that the casual user, not just the computer expert, can feel comfortable with.

The integration problems between workers and computers will eventually be solved. Expert systems, natural language technology, machine vision, and other developments are already narrowing the gap between man and machine.

But as long as keyboards stand between people and computers, their partnership remains at arm's length. Developments like touchscreens, the mouse, and light pens are helping to narrow the distance. However, the merger will be complete only when people and computers are able to speak together.

And such a time is not far off. Already computers that speak and listen to operators are finding their way into quality control, production and inventory control.

Voice technology includes voice synthesis (computer speech) and speech recognition. Computers that talk are commonplace (we hear them on phones, in cars), but ones that recognize speech are still a rare breed. However, it is the recent developments in speech recognition that are sparking industry's interest in the technology.

Speech recognition was an $11 million industry in 1984 and a $16 million industry in 1985. The figures could reach $22 million this year and top $65 million in 1989, according to International Data Corp., Framingham, Mass. By 1989 more than 400,000 speech recognition products are expected to be sold, with a high percentage of sales addressing shop floor needs.

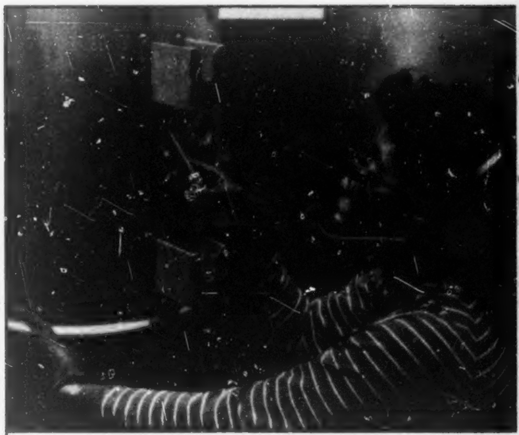
Impressed by the potential of voice technology, firms like Intel and Westinghouse recently have jumped into voice recognition market with new products.

"Today, we are seeing increasing movement toward real-time factory floor data collection and feedback," said Alan Mandel, general manager, Westinghouse Voice Systems, Pittsburgh. "For several years now, we have thought speech recognition technology, generally, has been good enough to use in the factory. We have had work on improving it's capabilities in noisy environments, but basically, the limiting factor has not been the technology but an absence of complete systems or easy-to-use application tools."

With the development of these application tools, Mr. Mandel believes voice technology is now within the reach of any manufacturer with a strong need for real-time or simply accurate information.

Tasks Made Simpler

Computers that talk and listen can make a wide variety of factory floor tasks simpler. Certain jobs—particularly those in inspection and inventory control—offer natural applications for voice technology. Often in these areas, a worker's hands



At Westinghouse's Transformer Division, an operator using voice input enters transformer style numbers into a computer.

The Westinghouse Semiconductor Division installed a voice data collection system on its semiconductor fusion test line.

At the Westinghouse Industry Electronics Division, voice entry eliminated the hand recording of final inspection results.

U.S.Speech Recognition Systems Market

	Shipments		Installed Base
	In Units	Millions of Dollars	In Units
1984	6,300	11.3	10,200
1985	11,400	15.9	21,400
1986	20,600	21.7	42,100
1987	35,600	28.3	77,700
1988	78,400	45.6	155,900
1989	253,000	65.8	408,900

Source: International Data Corp. Framingham, Mass.

are busy and his eyes preoccupied. If hands and eyes are needed for other tasks, data input through voice is the obvious solution.

For example, if an an inspector has to inspect an airplane and record his findings at the same time, not only does his efficiency go down, the odds of him copying the data incorrectly or interpreting that copy incorrectly later on are high.

So the inspector purchases a headset (with microphone input and audio output), a speech synthesizer and a voice recognition system. With his hands and eyes now free to inspect, he can collect data more efficiently and accurately. In addition, his voice system automatically enters his data into a data base, making it immediately available for analysis and control.

The inspector finds that his job consists of responding to a series of computer-initiated audio prompts. The prompts tell him how to proceed with his inspection. After he responds to the prompts, his statement is repeated by the computer, enabling him to confirm that what he spoke was what the computer heard.

Speech technology is also popular with inventory managers who use it to sort parts, weigh assemblies, and double check orders.

Evidence points to a growing interest in voice technology: A rash of new products are coming on stream; users are vouching for the effectiveness of the technology; and systems are dropping in price.

Not everyone, however, is convinced that 1986 will be the year voice recognition at last fulfills the promise predicted for it years ago.

Doubters are saying that although the technology seems promising, voice recognition has been a perennially promising technology. It has also been a technology that often has failed to live up to its promise.

"The problem is that many early proponents in the voice industry were tremendous showmen-entrepreneurs. And they promised a lot more than their technology could deliver, so the people who bought the technology had unrealistically high expectations," explained Bruce Ryon, manager of marketing communications, Votan Corp., Fremont, Calif. "Some of these unrealistic expectations still exist, therefore we spend a lot of our time explaining realistically what the technology can and cannot do."

Unrealistic Expectations

What the technology cannot do is complex office-related tasks, but these are precisely what many people expect it to do.

"Many businessmen expect the products to perform like dictation machines. They are looking for voice-activated typewriters, or voice-activated word processors, and that technology just isn't here and won't be here for a number of years," explained Mr. Ryon.

However, just because voice technology is not yet ripe for the typewriter does not mean that it cannot work on the manufacturing floor. A typewriter capable of processing conversation would need a vocabulary of tens of thousands of words. And it would need to know how words are used—to decide, for example, whether 'here' or 'hear' should be typed. In short, it would have to make intelligent decisions that are beyond the scope of current artificial intelligence technology.

"Limited speech recognition has been achieved," said an IBM spokesman. "But, these achievements fall far short of unrestricted continuous speech recognition."

What has been achieved, however, is not trivial. These "limited" developments dovetail nicely with the data collection needs of the factory, since voice recognition systems in the plant don't have to understand a large number of words; most factory applications require vocabularies of 150 words. Nor need they be overly concerned about context.

"On the factory floor we are looking at applications needing hundreds of words, not thousands," emphasized Mr. Mandel of Westinghouse. "Each application uses a constrained set of words. The system takes an operator through a structured inspection sequence or a structured inventory control sequence where large vocabularies just aren't needed.

"What is needed on the factory floor are smaller vocabularies, high accuracy, the capability to operate in

Planners at Lockheed-Georgia Co. speak into a microphone and enter data into a computer that produces detailed manufacturing plans.

high noise and variable noise, and the ability to operate in a mobile situation, where an operator can operate over a wireless radio link. Also, I believe strongly that continuous speech recognition is also needed. If you are going to enter a part number, you need to be able to enter it rapidly, without having to pause between digits."

Factory Floor Needs

Westinghouse has worked with voice technology for five years, internally applying it to a variety of factory applications.

"Early on we discovered that there was a need for the industrial engineer out on the floor to be able to make changes in the system over the life of the system," explained Mr. Mandel. "So we spent a great deal of effort developing some advanced menu-driven tools to let a user who isn't a programmer or a speech technology expert use the system."

Like several of the major companies that are moving into voice technology, Westinghouse didn't develop the basic voice technology—the computer algorithms needed to capture the vagaries of human speech. Westinghouse began with basic Votan technology and added software and system layers on top of it. "What we bring to the party is the system integration and the software tools," said Mr. Mandel. "Our strength is our knowledge of manufacturing operations."

The strength of Votan—the most successful supplier of voice recognition products, with some 30 pct to 40 pct of the U.S. market—is its basic voice expertise. Its product line includes: a circuit card and software that add voice recognition and voice output capabilities to the IBM PC; a voice terminal that gives these abilities to micro- and minicomputers; and a multichannel voice processing/telephone management system.

Like Westinghouse, Intel recently introduced a new speech recognition product line aimed principally at factory applications.

"Although speech recognition has been successful in many applications, the harsh environment of factories—dirt, dust, vibration and high ambient noise levels—has prevented its use in industrial automation," said Dan Fink, marketing manager of Intel's Speech Systems, Phoenix. To overcome these limitations, Intel is using non-volatile bubble memory to combat dirt and vibration problems and a noise-canceling speech recognition algorithm to gain noise immunity.

Major Players

Other major players in the voice recognition market include Interstate, Texas Instruments, and NEC, to name but a few. They reportedly are directing much of their efforts at the office systems. Interstate, however, recently purchased the technology of Verbex, a division of Exxon Enterprises and a maker of speech recognition devices, and consequently could become more active in the factory market.

A recent announcement by IBM of a speech board that will fit into an IBM PC is significant, not because it targets the factory, but because it helps legitimize voice recognition.

Voice recognition systems come in a variety of shapes and sizes. Some products, for example, demand that users pause between each spoken word. Continuous speech systems, on the other hand, permit a user to enter commands and data using normal speech.

Also, current systems are either speaker dependent and speaker independent. A speaker-dependent product recognizes voice patterns of only one user. The user has to "train" the system before use. During training he must enter a vocabulary of specific words which the system will subsequently recognize. The computer must be retrained if the vocabulary is altered or someone new uses the machine.

A speaker-independent system can recognize words entered by any speaker. At present, speaker-independent systems have limited vocabularies—possibly 15 words.

Currently, voice technology is most prevalent in inspection and inventory control operations. However, other uses are evolving. For example, it is being incorporated into CAD/CAM systems, permitting operators to execute design functions both manually or verbally.

Also, Lockheed-Georgia Co., Marietta, Ga., is incorporating voice input technology into it's computer-based generative process planning system, GENPLAN. The system will detail step-by-step plans for fabricating and assembling parts.

"When planners are at a terminal, they often have their hands full with engineering drawings, manuals, and other documents," said a company spokesman. "Putting drawings down or turning away from the manuals to enter data takes time and breaks their concentration. That break in concentration costs time and can lead to errors."

Currently, the system allows the user to verbally input process plan information. In the future he will be able to to edit his process plan on

For highest Gage Accuracy, there's just one "point" to remember:
Carbide Probes, Inc.

DIAL TEST
ELECTRONIC
A.G.D. and METRIC
STAR PROBES
CMM Points Available.

Specials on request

Carbide Probes Inc. TM

1328 RESEARCH PARK DR.
DAYTON, OHIO 45432
513 - 429-9123

For Information, Circle 147

Quantity
PRODUCTION
of
GREY IRON CASTINGS

HIGH QUALITY...LOW COST
DEPENDABLE DELIVERY

NAR

THE WHELAND FOUNDRY
DIVISION OF NORTH AMERICAN ROYALTIES, INC.
CHATTANOOGA, TN 37402 PHONE 615/265-3181

For Information, Circle 146

the computer screen using voice.

The voice data entry system, based on an IBM PC AT, consists of a terminal emulation package called IRMA, a voice recognition board from Tecmar, and software developed by Lockheed. It is a user-dependent, discrete-word system.

Lockheed researchers got involved with voice technology because they saw a rapidly changing technology that had the potential to greatly improve productivity. "We are doing a lot of testing of different voice boards and we are writing some of our own software in an effort just to keep up with the technology," explained Luther Hudson, manager of Lockheed-Georgia's Computer-Aided Systems Department. "Recently circuit boards have been getting better and better. Continuous word recognition, however, is one area we feel still needs a little more development, at least in the manufacturing environment."

In the future, voice systems will become even more versatile. Certain industrial applications require extra large vocabularies, so tomorrow's systems will have larger vocabularies. Present systems can handle up to 500 or 600 words.

As vocabulary needs grow, Mr. Mandel expects the the voice technologies aimed at the office and those targeting the factory will begin to merge. At present IBM has an experimental system which allows voice input to create office documents such as letters and memos. It can recognize sentences computed from a 5,000 word vocabulary and identifies more than 95 pct of the words in these sentences correctly. In the future, this type of technology will find its way to the factory floor. Eventually, workers will be able to hold unstructured conversations with their computers.

However, Mr. Ryon of Votan believes that while voice systems will improve over time, the technology that is available today can handle many industrial tasks.

"Growth of voice technology depends not so much on new technology but on how quickly companies become aware of current applications," he explained. ☐

PRICE & PRODUCTION DATA

(Effective January 13, 1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	181	157	166	162
Pittsburgh	219	194	222	191
Youngstown	101	85	97	88
Lake Erie	122	113	123	140
Detroit	128	120	134	139
Chicago	487	467	386	410
Cincinnati	86	77	82	83
St. Louis	73	79	77	76
Southern	200	196	199	171
Western	83	75	72	71
U.S. Production	1,700	1,563	1,557	1,531

Source: American Iron & Steel Institute

Lake Superior Ore Prices

[illegible]

Pellets (per iron unit natural)	gross ton 58.0*
Pellets (per iron unit natural)	gross ton 59.4**
Pellets (per iron unit natural)	gross ton 72.5-86.9***
Mesabi, regular-unscreened	gross ton $32.53
Mesabi, non-bessemer	gross ton $30.03-31.53

[illegible]

STEEL PRODUCTION, COMPOSITE PRICES

(Effective January 13, 1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,700	1,563	2,592	2,306
Capability Utilization Rate	68.1	61.4	66.1	56.7

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb—eff. 1/1/86)	24.607	24.607	27.582	27.582
Pig Iron** (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	$ 73.17	$ 73.17	$ 70.17	$ 80.50
No. 2 bundles	$ 52.83	$ 52.83	$ 50.50	$ 52.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 73.50	$ 73.50	$ 71.50	$ 83.50
No. 1 steel, Philadelphia	71.50	71.50	69.50	77.50
No. 1 steel, Chicago	74.50	74.50	69.50	80.50
No. 1 bundles, Detroit	70.50	70.50	64.50	70.50
Low Phos., Youngstown	73.50	73.50	69.50	72.50
No. 1 mach'y cast., Pgh	68.50	68.50	68.50	66.50
No. 1 mach'y cast., Phila	92.50	91.50	91.50	98.50
No. 1 mach'y cast., Chi	104.50	104.50	97.50	111.50

[illegible]

NONFERROUS PRICES

[illegible]

Primary Metal Prices

Cents per lb	[illegible]	[illegible]	[illegible]
Aluminum (LME)	56.79	50.19	1/13/86
Copper (C)	68.50- 70.00	66.00- 69.00	1/13/86
Lead	18.50- 19.50	18.25- 19.50	12/16/85
Magnesium Ingot	153.00	145.00	12/9/85
Nickel (LME)	189.27	186.42	1/13/86
Zinc	35.00	35.00	11/6/85

[illegible]

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.25-1.50
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz	$339.40
Indium, dollars per troy oz	$2.50
Iridium, dollars per troy oz	$430.00
Magnesium sticks, 10,000 lbs	$2.02
Mercury, per 76-lb, f.o.b. N.Y.	$320.00-330.00
Molybdenum, lb, tech. moly oxides, 20 lb. MO can	$3.00-3.13
Palladium, per troy oz	$100.00
Platinum, per troy oz	$358.00
Rhodium, per troy oz	$1,125.00
Silver ingots, per troy oz	$6.03
Titanium sponge, tech grade	$3.40-3.55
Tungsten powder, hyd. red	$9.30-9.50
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb unless otherwise noted)

Straits Tin Price

[illegible]

Jan. 6—TRADING Jan. 9—
Jan. 7—SUSPENDED Jan. 10—
Jan. 8—

Scrap Prices
Brass Mill Scrap

[illegible]

	Solids	Turnings
Copper	61	52
Yellow brass	51¼	45¼
Red brass	55	48½
Comm. bronze	57½	49½
Mang. bronze	43	42
Free cutting rod ends	46	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	58
No. 2 copper wire	53
Light copper	42

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	54
No. 2 copper wire	47
Light copper	38
No. 1 composition	47
No. 1 comp. turnings	46
Hvy. yellow brass solids	29
Hvy. yellow brass turnings	26
Radiators	36

Aluminum

New mixed clips	35	— 36
Old sheet	32	— 33
Old cast	32	— 33
Clean dry borings	33	— 34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	25	— 26
Mixed I.C. clips	22	— 23
Old sheets and cast	20	— 21
Borings and turnings	16	— 18
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 39
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 16
Old diecast zinc	11	— 13

St. Louis price reporting change

Effective Jan. 6, *Iron Age* revised scrap prices reported for the **St. Louis** market to align its prices with those paid by the consumers in that region. For many of the grades in that market, the actual market prices did not rise as much as the *Iron Age* prices rose.

For additional information, contact Michael Marley, Managing Editor, Iron Age, Chilton Co., Chilton Way, Radnor, Pa. 19089.

EFFECTIVE JANUARY 13, 1986

[illegible]

Ferrous Scrap Prices

Pittsburgh

[illegible]

Chicago

[illegible]

Philadelphia

[illegible]

Detroit

[illegible]

Youngstown

[illegible]

Cleveland

[illegible]

Buffalo

[illegible]

St. Louis

[illegible]

Birmingham

[illegible]

Cincinnati

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	73.00 to	74.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	81.00 to	82.00
Rails, random length	64.00 to	65.00
Rails, 2 ft. and under	79.00 to	80.00
No. 1 cupola cast	64.00 to	65.00
Heavy breakable cast	27.00 to	28.00
Drop broken cast	71.00 to	72.00

New York

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	445.00 to	465.00
18-8 borings	340.00 to	365.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	35.00 to	37.00
No. 1 dealer bundles	32.00 to	34.00
No. 2 dealer bundles	20.00 to	22.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	11.00 to	12.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace 1 ft. and under [illegible]	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 81.00
No. 2 hvy. melting, cut 2 ft. and under	72.00
No. 1 dealer bundles	86.00
No. 2 bundles	61.00
Mixed steel scrap	59.00
Bush. new fact. prep'd	81.00
Bush. new fact. unprep'd	64.00
Machine shop turnings	34.00
Short steel turnings	34.00
Mixed borings and turnings	19.00
Cast scrap	89.00

Houston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	57.00 to	58.00
No. 2 bundles	42.00 to	43.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	30.00 to	31.00
Shredder scrap	79.00 to	80.00
Cut structural plate, 2 ft. and under	101.00 to	102.00
Cut structural plate, 5 ft. and under	83.00 to	84.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	85.00 to	86.00

PRODUCER KEY
With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N.Y.
G7 Georgetown Steel Corp., Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens, Inc., Coatesville, Pa.

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Nelsen Steel & Wire Co., Chicago
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N.Y.
R5 Roblin Steel Corp., North Tonawanda, N.Y.
R7 Rome Strip Steel Co., Rome, N.Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Corp., Buffalo, N.Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh

W3 Weirton Steel Corp., Weirton, W. Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh
W14 Whittar Steel Strip Div., Whittar Industries, Ltd., Detroit

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

[illegible] deemed representative by Iron Age and then [illegible] actual transaction prices obtained by any [illegible]

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Hot Rolled 8620 As Rolled	Hot Rolled 4140 Annealed	Cold Drawn 8620 As Rolled	Cold Drawn 4140 Annealed
Atlanta	24.16	30.15	33.60	26.68	24.88	23.22	21.05	28.73	35.62	44.85	57.90	66.57
Baltimore	24.11	28.97	34.02	31.14	30.35	28.49	23.78	33.08	46.54	50.79	57.10	65.47
Birmingham	22.79	27.62	32.60	26.44	23.68	23.33	22.35	29.13	43.72	49.65	58.62	66.75
Boston	30.98	37.08	43.12	41.54	31.23	29.70	25.01	32.57	38.73	40.46	49.57	54.66
Buffalo	27.96	33.52	39.73	34.24	28.37	25.84	21.26	30.07	37.80	38.46	44.68	52.51
Chicago	25.81	32.81	36.03	24.23	21.92	20.59	19.30	24.99	29.30	36.30	44.26	48.92
Cincinnati	26.69	32.94	35.92	24.96	24.66	19.88	18.68	26.34	31.24	37.41	42.52	48.90
Cleveland	25.57	32.17	35.64	27.60	24.19	22.15	19.05	28.26	34.10	37.45	42.76	50.25
Denver	28.28	35.17	34.44	31.39	26.36	24.20	21.49	34.15	44.04	51.41	57.29	63.86
Detroit	26.43	33.16	35.33	24.16	24.66	20.50	19.06	26.32	31.14	37.08	42.57	49.48
Houston	24.82	27.06	30.33	33.41	24.72	24.31	22.05	36.65	42.12	41.99	53.65	60.00
Kansas City	27.62	34.67	36.90	26.86	25.35	21.25	18.40	30.97	36.41	39.84	44.87	50.82
Los Angeles	24.59	29.20	30.08	30.99	31.93	32.90	33.00	34.91	35.97	37.06	38.18	65.41
Memphis	21.73	30.60	31.64	26.90	24.43	24.15	21.65	30.50	33.71	44.20	54.48	63.87
Milwaukee	26.03	32.57	35.82	26.25	24.99	21.28	19.27	25.16	32.23	36.77	41.78	48.91
New York	29.19	36.09	40.14	36.38	30.67	25.04	22.47	33.05	36.74	41.43	44.90	51.13
Philadelphia	25.17	32.64	38.45	38.00	27.96	26.10	22.25	29.00	37.35	42.07	49.95	56.28
Pittsburgh	34.95	38.19	42.75	34.22	33.37	27.78	25.62	27.40	35.31	39.15	44.84	50.07
Portland	25.98	29.47	36.46	31.41	32.56	34.45	27.54	37.58	46.18	51.65	63.57	.....
San Francisco	24.49	29.71	30.61	31.53	32.49	33.47	34.00	35.52	36.59	37.70	38.84	65.41
Seattle	27.78	28.19	29.04	29.92	30.22	31.75	32.00	33.70	34.72	35.17	36.85	65.16
Spokane	20.41	28.63	28.65	32.28	32.02	33.63	23.45	36.94	39.45	42.17		54.16
St. Louis	26.11	29.84	29.84	26.73	23.57	19.95	19.63	29.16	34.95	38.09	43.11	49.76
St. Paul	25.90	31.58	31.58	30.83	23.67	26.52	19.13	28.60	34.40	37.29	42.36	49.30

Base Quantities: All the products may be combined for quantity. Hot rolled sheet: 10 ga x 36 x 96 - 120. Cold rolled sheet: 20 ga x 36 x 120. Galv. sheet: 18 ga x 36 - 120. Hot rolled strip: [illegible] x 1". Plate: 1/4" x 84. Shapes: I-Beams 6 x 12.5. Hot rolled bar—Rounds [illegible]. Cold finished bar: C 1018 - 1" rounds. Alloy bars: Hot rolled 8620 - 1-5/8" round. Cold drawn - 1" round. Hot rolled 4140 - 1-5/8" round. Cold drawn - 1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

Codes identify Producers listed on p. 64. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A. = Not available

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling,	
Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging,	
East	
B3(2)	$473.00
C10	$473.00
Midwest	
W5	$453.00
S1	$473.00
I3	$473.00
C10	$473.00
K2	$473.00
West	
C6	$420.00
Alloy,	
East	
B3	$512.00
C10	$512.00
Midwest	
W5	$492.00
I3	$512.00
C10	$512.00
S1	$512.00
West	
C6	$469.00

Structurals

Carbon,	
East	
B3	23.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3	23.90
T10	23.90
N4	23.90
South	
T10	22.90
High Strength, Low Alloy,	
East	
B3	23.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
Wide Flange, Carbon,	
East	
B3	20.65
U1	22.75
J3	23.90
Midwest	
U1	22.75
N4	23.90
I3	23.90
Wide Flange High Strength Low Alloy,	
East	
U1	24.30
Midwest	
U1	24.30

Strip

Hot Rolled, Carbon	
Cut II Edged, all widths	
East	
U1	20.75
B3	20.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3	22.05
W3	22.05
G2, G3	20.75
N4	22.55
W5	23.75
U1	20.75
A7	20.75
I3, B3	20.75
M2	22.05
S1	20.75
Cold Rolled, Carbon Max. 25%,	
East	
E4	29.75
S10	29.60
P15	24.80
R7	36.20
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05
High Strength, Hot Rolled, Low Alloy, Cut Edge & Mill Edge All widths (plus extras)	
Midwest	
M2	22.05
W3	22.05
J3	22.05
G2, G3	20.75
S1	23.75
A7	25.35
High Strength, Cold Rolled, Low Alloy, Mill Edge	
Midwest	
R7	44.65
S1	37.05
Alloy, Hot Rolled,	
Midwest (plus extras)	
S1	26.10
I4	25.20
Alloy, Cold Rolled,	
East (plus extras)	
E4 M8	43.35
B4	49.75
R7	42.95
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot Rolled, Carbon (18 Ga & Heavier)	
East	
B3	20.75
J3	22.05
U1	20.75
Midwest	
M2, W3	22.05
D1	22.05
J3	22.05
G2, G3	20.75
I4	22.45
U1	20.75
S1, B3	20.75
I3	23.75
A7	23.75
W5	23.75
West	
U1	21.25
Cold-Rolled, Class I	
East	
B3(2)	25.15
J3	26.15
U1	25.15
Midwest	
W3	26.15
M2	26.15
G2, G3	25.15
M11	25.15
J3	26.15
D1	26.15
U1	25.15
S1	25.15
B3	25.15
I3	28.15
A7	28.15
W5	28.15
West	
U1	25.65
Galvanized (hot dipped)	
East	
B3(2)	27.30
U1	27.30
Midwest	
J3	28.00
D1	28.00
W3	28.00
Y1	28.00
G2, M11	27.30
U1	27.30
S1	30.30
W5	30.30
I3	30.30
A7	30.30
West	
U1	27.80
Enameling,	
Midwest	
U1, S1	26.65
I3	29.65
A7	29.65
J3	27.65
Long Terne,	
Midwest	
W5	31.65
A7	31.65
U1	31.65

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
East	per base box
J3	26.29
U1	30.12
Midwest	
U1	30.12
J3	26.29
M11	28.61
W3	26.29
W5	30.12
West	
U1	30.62
South	
U1	30.12
Double Reduced (55 lb)**	
Midwest	
M11	22.84
J3	21.49
U1	24.33
W3	21.49
W5	24.33
West	
U1	24.83
South	
U1	24.33
Black Plate	
Single Reduced (70 lb)*	
East	
B3	26.55
Midwest	
J3, W3	24.01
I3	24.57
W5	26.55
U1	26.55
M11	27.30
West	
U1	26.55
Double Reduced (55 lb)	
East	
B3	21.32
Midwest	
U1, M11	21.32
W5	21.32
W3, J3	18.93
West	
U1	21.32
South	
U1	21.32

*75 lb. base weight extra 69¢
**50 lb. base weight extra $1.40

Bars

Carbon Steel, Hot Rolled (Special quality)	
East	
R5	25.80
K3	25.80
J3	25.80
C10	27.05
B3	27.05
Midwest	
I4	26.00
I3	27.05
T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
Cold Finished Carbon,	
East	
A11	22.15
T11, S8	31.00
J3(4), L2	31.00
M8, W10	31.00
N1	24.475
R4, B4	33.25
C10	31.00
Midwest	
W10	33.25
J3	31.00
B1	33.45
L2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
South	
J3	31.95
Alloy, Hot Rolled,	
East	
R5	27.95
K3	27.95
B3	29.20
C10	29.20
Midwest	
I3, C10	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold-Drawn,	
East	
L2	35.20
N1	37.90
R4	37.10
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
Midwest	
J3, W10, C10	34.85
B1	37.30
N9, L2	34.85
B5, M9	38.60
South	
J3	35.85

Plates

Carbon Steel	
East	
B3, U1	18.25
L4	18.25
P2	18.25
J3	26.75
Midwest	
B3, U1	18.25
I3	25.75
J3, A7	22.80
I4	25.75
S1	25.75
West	
U1	18.25
O2	23.00
South	
U1	18.25
Alloy East	
U1	28.55
P2, L4	33.55
J3	34.55
Midwest	
U1	28.55
I4	33.55
West	
O2	31.00
South	
U1	28.55

Wire

Carbon Steel	
East	
B3	27.10
A11	22.15
Midwest	
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

ORDERS CONTINUE TO SLIP AND SLIDE

November marked the third straight month of decline in new orders received by producers of durable goods. Orders in November totaled $105.8 billion, down 0.6 pct from October.

But the November decline wasn't the only bad news on orders. After all, orders in October were down even more sharply as they tumbled 2.3 pct below September volume.

In all, as 1985 neared an end, orders were shaping up poorly. In November, orders were up only 1.3 pct from the year-ago period. That means, after allowing for inflation, there was a 3 pct to 4 pct decline in real dollars' order volume over the year-long period.

Moreover, as many executives in basic goods industries can testify, orders for their products were down more sharply than the overall trend line. Motor vehicles were the only basic goods showing any strength in orders through the first 11 months of 1985.

There were no special strengths or weaknesses along industry lines for orders in November. As U.S. Commerce Dept. analysts noted, "the decline...resulted from offsetting increases and decreases."

Transportation equipment was down $1.9 billion, or 7.1 pct, to $24.6 billion. In both October and November, declines in aircraft and shipbuilding more than offset gains in the motor vehicles industry.

Also down in November, were orders for primary metals. This decline was more than offset by increases in orders for machinery, both electrical and nonelectrical, and for fabricated metal products.

One of the very soft spots has been in orders for nondefense capital goods. In November, orders for these big-tag items were down 3.5 pct from September, and down 11.2 pct from February of last year.

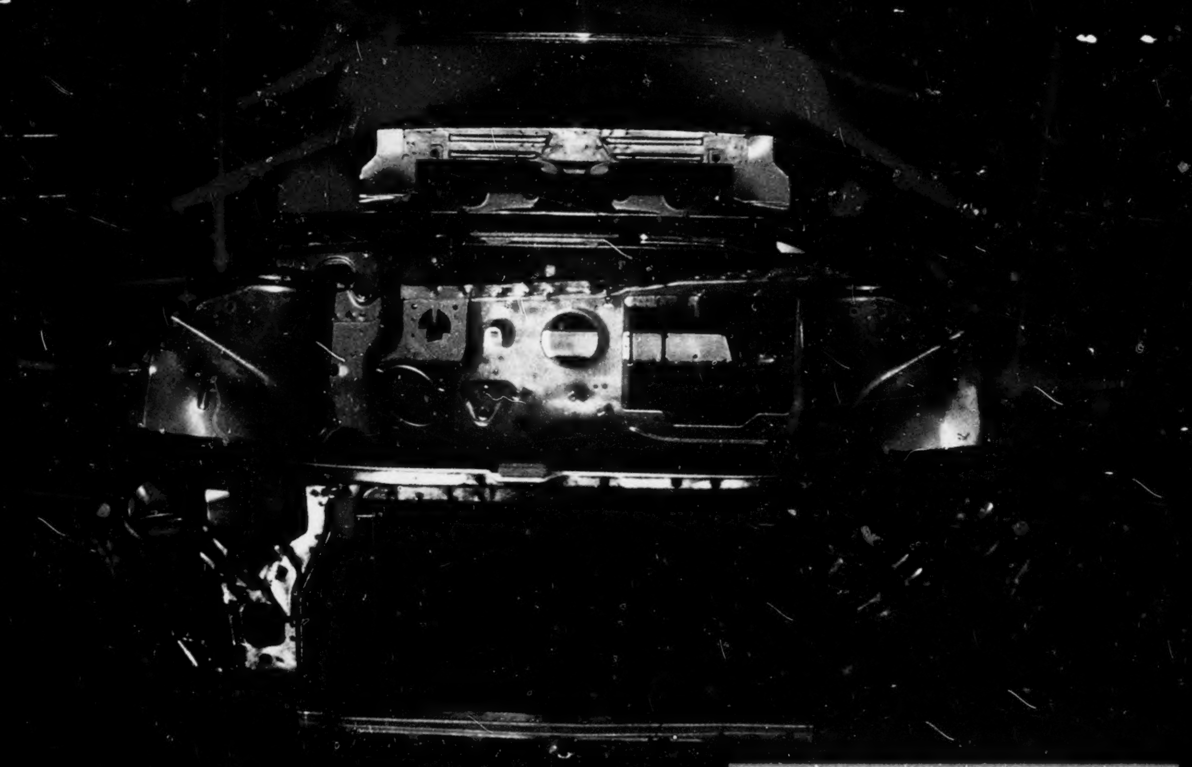
Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted Source: U.S. Dept of Commerce		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	4th Qtr*	$387.4	$389.5	$368.3
Manufacturing, Total	4th Qtr*	156.0	157.8	147.0
Manufacturing, Durable Goods	4th Qtr*	74.7	75.8	71.4
Mining Industry	4th Qtr*	15.8	16.3	17.0
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	Nov.	104.2	104.5	104.4
Shipments	Nov.	107.1	106.5	102.4
Inventories	Nov.	190.1	190.5	190.7
Unfilled Orders	Nov.	351.6	354.5	348.1
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	Nov.	26.2	27.1	26.5
Capital Goods Producers Defense Industries	Nov.	7.0	6.2	10.1
Primary Metals, Total	Nov.	10.5	10.7	10.5
Steel (SIC 331)	Nov.	4.4	4.6	4.4
Iron & Steel Castings (SIC 332)	Nov.	1.4	1.2	1.1
Nonferrous Metals	Nov.	4.7	4.9	5.0
Nonelectrical Mach.-Equip. Industries, Total	Nov.	18.0	16.7	17.9
Engines & Turbines	Nov.	1.6	1.0	1.3
Farm Machinery & Equipment (Shipments)	Nov.	0.9	0.9	0.8
Construction, Mining & Mat. Hdlg. Equip	Nov.	3.0	2.8	2.7
General Industrial Machinery	Nov.	1.5	1.3	1.5
Fluid Power Equipment** (Index-1972=100)	Nov.	279.0	288.0	269.0
Metalworking Machinery	Nov.	0.8	0.9	0.9
Machine Tools, Total ($Mill., Unadjusted)***	Nov.	186.2	229.9	212.0
Machine Tools, Metalcutting***	Nov.	171.6	156.0	160.0
Machine Tools, Metalforming***	Nov.	14.6	73.9	52.0
Electrical Mach. & Equip. Industries, Total	Nov.	16.3	15.8	15.0
Elec. Transmission Equip. & Ind. Apparatus	Nov.	2.3	2.2	2.0
Household Appliances	Nov.	1.5	1.5	1.4
Communication Equipment	Nov.	5.5	5.3	5.1
Transportation Equipment, Total	Nov.	24.6	26.5	28.5
Motor Vehicles & Parts (Shipments)	Nov.	18.1	17.6	17.4
Aircraft, Missiles & Parts	Nov.	6.4	7.9	9.7
Shipbuilding & Military Tanks	Nov.	-0.5	0.3	0.9
Fabricated Metal Products, Total	Nov.	15.1	14.8	13.1
Instruments, Total	Nov.	4.8	4.6	4.6

*Est. Commerce Dept. **Source: National Fluid Power Assn. ***Source: NMTBA

C215

IRON AGE
MANUFACTURING MANAGEMENT

STATE-OF-THE-ART AUTOMAKING: GM'S DETROIT/HAMTRAMCK PLANT



AMERICA'S NEW SUPERPLANTS

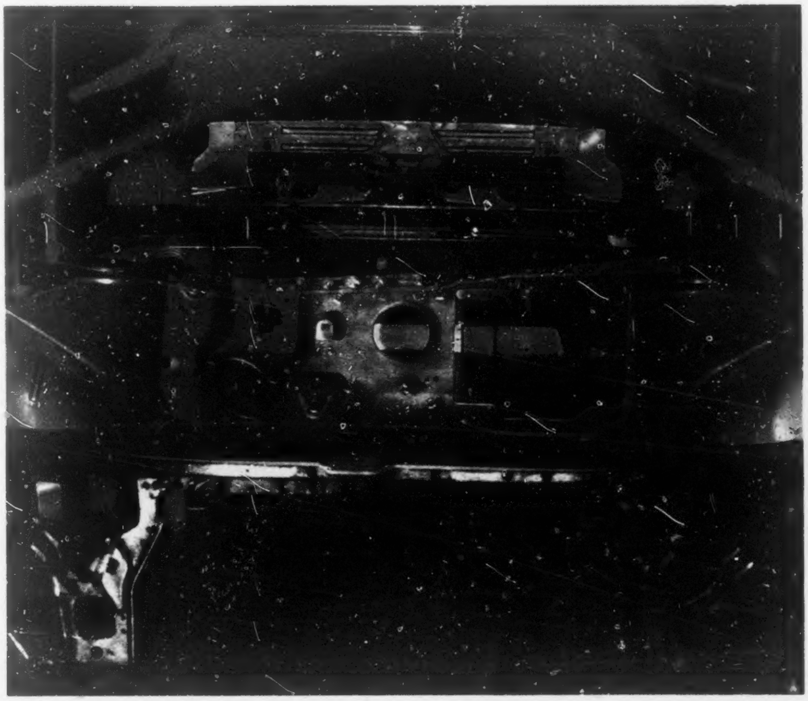
How Does Your Plant Rate In Equipment Productivity?

The Standard That Simplifies NC Machining

CK01 4CONGRESSION00
AUG86
CONGRESSIONAL INFO SERV /
SRI ACQUISITIONS DIR
4520 EAST WEST HWY
BETHESDA MD 20814

FEBRUARY 21, 1986 VOL. 229, NO.4

CHILTON'S IRON AGE
MANUFACTURING MANAGEMENT



Departments

EDITORIAL STAFF 8

LETTERS 11

INDUSTRY BRIEFS 22

PRODUCT & EQUIPMENT REVIEW 57

AD INDEX 58

BUSINESS STAFF 58

MANAGEMENT SERVICE CARD 59

P&P DATA 1/27 65

FERROUS SCRAP 1/27 66

CLEARING HOUSE 67

Editorial 7
Even twenty minutes is too long.

Newswatch 17
Chrysler increases spending as auto competition intensifies.

Detroit-Hamtramck 24
The General Motors' plant is state-of-the-art automaking.

Equipment Productivity 33
The drive for greater equipment productivity gains momentum.

Permanent Molds 41
Why aren't foundries capitalizing on metal mold's potential?

NC Programming 48
BCL standard simplifies numerical control machining.

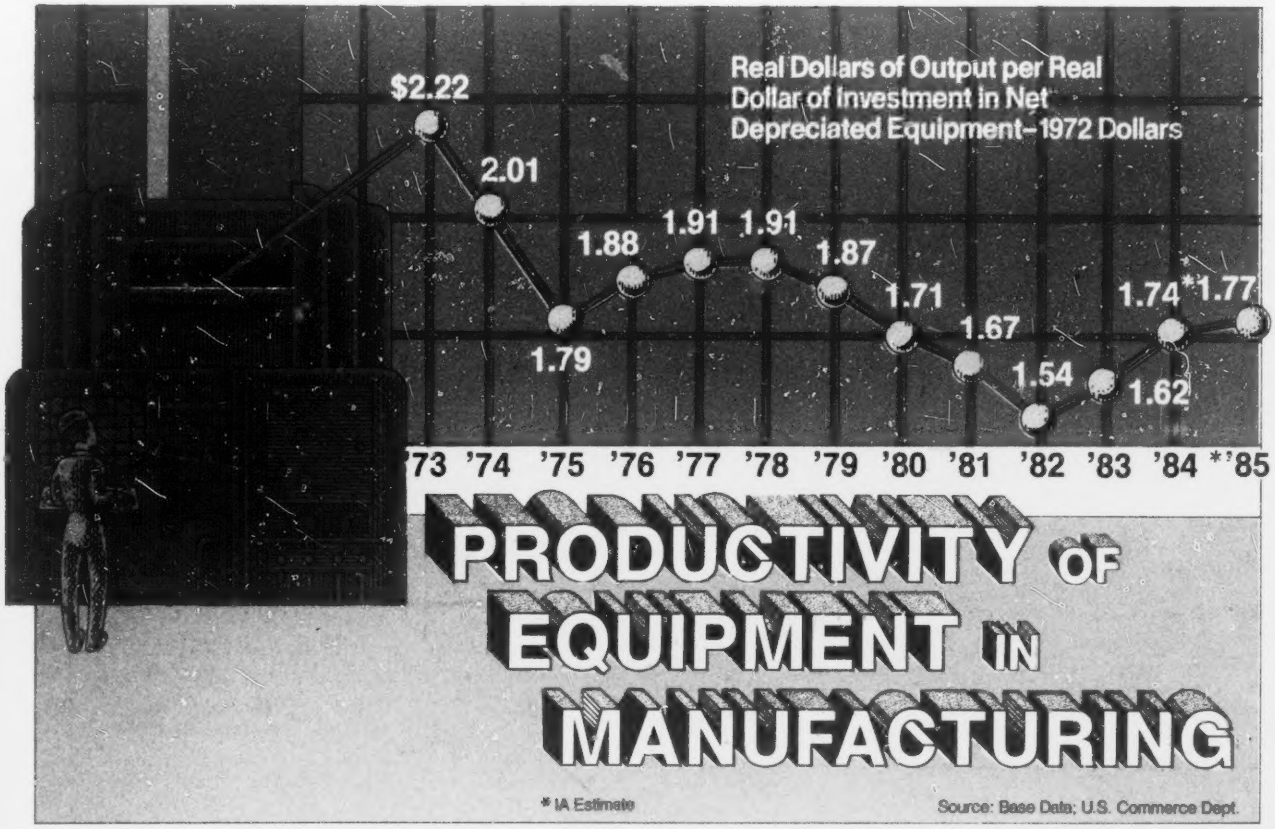
Materials Report 63
Firmer sheet prices could bolster steel profits.

Price Trends 68
Prices continue to walk a treadmill.

Next Issue: In Pursuit of Quality—Forging.

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year; $85 Canada, foreign (24 issues). Metalsproducer edition—$30 one year; $56 Canada, foreign (12 issues). Single copies: $3.00.
Cable: Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077

Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES



* IA Estimate

Source: Base Data; U.S. Commerce Dept.

HOW DOES YOUR PLANT RATE IN EQUIPMENT PRODUCTIVITY?

Put another way—how many dollars of output are you getting for each dollar of equipment? That's a key challenge as manufacturing becomes more and more capital intensive.

BY JOHN D. BAXTER

The recent and continuing drive by U.S. manufacturing companies to become leaner, meaner and tougher may face its greatest challenge this year.

For one, much of the restructuring, retrenchment and corporate tightening up that can be done, has been done. Gains from now on will be hard-bitten ones.

Too, 1986 does not promise to be a year of strong economic growth and it follows a year when the economy slowed sharply from the previous year. Lagging economic growth leads to slowed production lines. And that makes it tougher to hold down unit production costs.

And, drawing the circle tighter, there is the real prospect that plant spending will decline. The latest U.S. Commerce Department survey of business executives points to a 1 pct dip in real terms. Further, capital appropriations by the 1,000 largest U.S. manufacturers were recently cut back by 11 pct, according to the Conference Board.

The capital goods market is a key one for basic goods industries, where some of the most urgent restructuring is taking place. When plant spending lags, production lines of suppliers of capital goods also lag. Long-term corporate strengthening moves will suffer as managers deal with their pressing short-term problems.

To top it off, imports are expected to roll in at tidal force and force domestic production lines to operate at less-than-optimum levels.

Even if the dollar exchange value falls steadily, trade analysts warn, importers will cut their prices to hold on to market shares here.

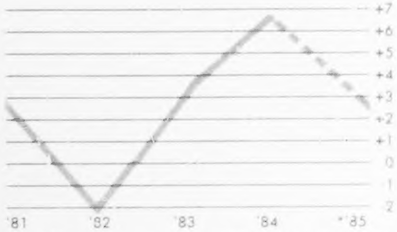
The Squeeze is On

So, the challenges to U.S. manufacturers continue. The main-line effort of manufacturing managers will be to get the most out of the assets

EQUIPMENT PRODUCTIVITY

The 1983-84 surge in the U.S. economy . . .

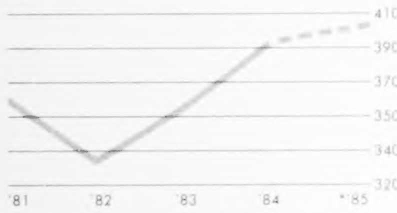
GNP—Pct Annual Changes in 1972 Dollars



*I.A. Estimate Source: U.S. Commerce Dept.

. . . gave such a sharp boost to factory output . . .

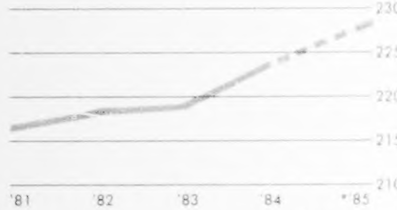
GDP—Manufacturing, Billions of 1972 Dollars



*I.A. Estimate Source: U.S. Commerce Dept.

. . . that, even with more equipment on line . . .

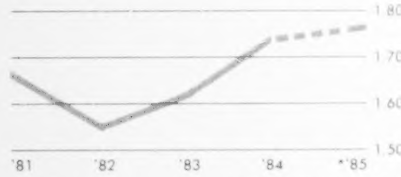
Net Stock, Capital Equipment in Mfg. Billions of 1972 Dollars



*I.A. Estimate Source: U.S. Commerce Dept.

. . . productivity of plant equipment rose sharply.

Equipment Productivity, Mfg.—Real Dollars of Output per Real Dollar of Investment in Net Depreciated Equipment



*I.A. Estimate Source: U.S. Commerce Dept.

they now have on their plant floors—or any new assets they acquire. Importantly, that means getting the most out of their production equipment.

Some progress has been made in the past two years on improving productivity of manufacturing equipment. Still, say many management consultants and others, much more attention to this subject is needed by manufacturing managers.

The corporate hunt for the people to carry on this drive for greater equipment productivity has intensified. Recently, a spokesman for the executive recruitment firm, Korn Ferry International said, "The focus now is on greater efficiency, on finding operational experts and engineers. Companies are interested in people who can squeeze efficiencies out of operations."

It seems clear then that one of the hottest subjects in manufacturing this year will center on productivity of plant equipment. Simply, this refers to the return on investment on capital stock in use. It is a measure of return on capital—in this case, the return on capital stock.

The guru of U.S. management consulting, Peter F. Drucker, said, "Despite its importance and payoff, not many business managers pay much attention to the productivity of capital, let alone work systematically at raising it."

Consultant Drucker, and others, report that many companies have more refined measures of labor productivity than they do for equipment. Yet, manufacturing companies are becoming more capital intensive all the time. It is true that capital/output ratio analysis is used fairly widely, but this measure has a broader base than just production equipment.

What the Record Shows

So, how has equipment productivity in manufacturing fared in the most recent critical period? What forces have been shaping it?

Some years ago, *Iron Age*, after consultation with productivity experts, developed a measure of manufacturing equipment productivity. This article updates the trend that *Iron Age* has monitored in a number of past articles. (For an explanation of methodology, see box: How Productivity is Figured.)

In brief, the productivity measure used shows the dollar value added by manufacturers in making their products for each dollar's worth of equipment used. The dollar figures used are real ones, that is, stripped of inflation distortion. Too, the equipment is net of depreciation.

On the basis of the *Iron Age* measurement, the trend in productivity of equipment used in U.S. manufacturing industries for 1973 through that estimated for last year, is shown in the chart here (see p. 33).

The year 1973 is used as a starting year because it was an apparent watershed year in the U.S. economy; it marked the start of a new long-term era.

The point that jumps out on the chart, of course, aside from the long-term slide, is the upturn in productivity for the years 1983 through 1985.

The Forces at Work

What made equipment productivity go up in those years? A look at the input and output elements of this productivity ratio gives the explanation.

The years 1983-85 marked a period of relatively strong U.S. economic growth. This prosperity gave a lift to manufacturing output (the output element in the productivity ratio). At the same time, the coming on line of new equipment (the input element) lagged. Thus, output moved up more sharply than input, so productivity rose.

The lag in equipment expansion in the covered period was due largely to the fact that output of manufacturers, their Gross Domestic Output (GDP), had suffered through five "down" years for the economy over the preceding six-year period of 1977-82.

It took some time (until 1983) for manufacturers to again start putting new equipment on line in any good size numbers. Meanwhile, much equipment had been depreciated, or pulled out of production as part of industry restructuring.

More than any other force, it is the rise and fall of the overall economy that shapes the trend line of manufacturing equipment productivity. When business is good, manufacturers' GDP, or value-added output, rises.

Conversely, when business is slow, this output sinks. The input factor, equipment, moves along a more steady bearing. In one sense, it can be said that as the economy goes, so goes the productivity of manufacturers equipment. It is the output factor that tends to snap the whip on productivity performance.

Overall, the productivity chart here makes it clear why 1973 was chosen as a starting year. The long-term downswing in productivity is explained by the fact that the average annual growth rate (per real GNP), for the U.S. economy in the 13-year 1973-85 period came to 2.5 pct. That rate lagged the postwar U.S. rate of 3.5 pct. More markedly, the 1973-85 economic growth rate was down sharply from the 3.9 pct growth rate for the 13-year period preceding 1973.

The difference in growth thrust in the compared 13-year periods was actually sharper than indicated by the growth percentages. There were four years of negative growth between 1973 and 1985, as compared to one year of negative growth in the previous 13-year span. That kind of economic whiplash curtails capital investment.

At the Factory Level

Equipment productivity at the factory level moves up and down in much the same way as it does at the overall manufacturing level. In factory-level terms, when production volume is rolling strongly through a plant, and operating rates are near preferred, or optimum, rates, equipment productivity runs high. But when orders are off and output levels sink, a plant's equipment productivity takes a dive.

In other words, as far as impact on equipment productivity goes, there is little difference between mechanical downtime at the plant level or economic downtime at the overall manufacturing level. All downtimes, at whatever level they hit, take a terrible toll on productivity.

Still, equipment productivity at individual companies will not always run hand-in-glove with rises and falls in the economy. Their markets may not move closely with the overall business cycles. But their equipment productivity will vary according to the state of activity in their markets. One way or another, strong product demand helps boost productivity, and weak demand pushes it down.

The "output" element is shown to be the big shaper of equipment productivity. Still, the "input" element—equipment—can also greatly affect productivity. It is known that an infusion of new equipment on production lines can lead to lower product prices or goods of improved quality, which, in turn, can lead to increased sales and output volumes.

An increasing number of companies have done all the retrenchment and fat-trimming they feel they can do, according to leading industry consultants. Some of these companies are starting to invest in the latest manufacturing technologies. "It might be called a Phase Two movement towards becoming low-cost producers or world-class competitors," said one consultant. "Phase Two is a drive for even lower unit costs and improved product quality through productivity gains; it chiefly involves investment in computer-related production equipment."

How Productivity is Figured

Any productivity figure is a ratio based on an input factor and an output factor. In determining productivity of manufacturing equipment, a variety of input and output factors can be used. Resulting productivity measures will differ according to the input/output factors employed.

The approach used in this article to measure productivity of manufacturing capital equipment is one developed by *Iron Age* after discussion with a number of experts. All the base data used comes from the U.S. Commerce Department.

Here is how *Iron Age* arrives at its productivity figures:

Input is the investment in net constant dollars (1972) in equipment in use by U.S. manufacturing industries. The "net" means the dollar value of investment after an allowance has been made for depreciation of such equipment. The "constant dollar" reference means, of course, the dollar value after allowing for inflation.

Output, in the productivity ratio, is gross domestic value of output of U.S. manufacturers. That means that output is the dollar value added by manufacturers on goods produced by them in this country—in terms of inflation-adjusted dollar volume.

Productivity, then, is the dollar value added by manufacturers for each dollar's worth of equipment used—all dollars inflation-adjusted and equipment value net of depreciation.

For example, U.S. manufacturers in 1982 had an estimated gross domestic output (value added) of $337 billion. They achieved that output by using capital machinery and equipment valued at,$218 billion. That meant that each dollar's worth of equipment in use produced $1.54 worth of output.

Now, look at the chart on equipment productivity. Compare the $1.54 figure for 1982 with the $1.77 figure for 1985. That comparison shows that productivity of equipment used in U.S. manufacturing was up 15 pct in 1985 over 1982. Still, as reflected in the chart, productivity in 1985 was down some 20 pct from the recent-years high of $2.22 in 1973. The reasons for these differences, and other changes in the levels of equipment productivity, are discussed in the article.

While the importance of productive equipment is clear enough, a number of plant productivity experts contend that it is still given little attention by a great many manufacturing managers. This point was brought out in an in-depth study made by a management consultant at five manufacturing plants in New England.

The study found the equipment utilization rates running at an average 35 pct of capacity. These low rates were not due to slack market demand or too few work orders flowing through the plants. The low-productivity findings, noted the analysts, were "about in line" with what they had found during more casual visits to dozens of manufacturing plants over the years.

Notably, in all companies, labor utilization rates ran higher than equipment utilization rates. This, despite the fact, as noted here, that manufacturing is becoming more capital intensive all the time.

"Direct labor," said Stephen Moss at another consulting firm, Arthur D. Little, Inc., "may no longer be the area of opportunity for greater productivity for U.S. companies."

The slighting of equipment productivity by many plant managers is confirmed by Peter Drucker. He says that in the hundreds of manufacturing companies he has looked into, many used elaborate feasibility study programs when acquiring capital equipment, but "very few had follow-up programs to keep track of the actual performance of the equipment once in operation."

A Veil is Lifted

Recently, the Commerce Department commissioned a study to find out more about the international competitiveness of U.S. manufacturers. This study, made by Philadelphia's Technology Management Center (TMC), gives valuable insights on what is needed in terms of acquisition and use of modern equipment to make it most productive.

The TMC study, an in-depth one that included a survey of 90 manufacturers, covered on-site looks at 42 of them. One key finding pointed to a high payoff for those companies that have properly acquired and used the latest in manufacturing technology, including equipment.

"Technologies such as numerical control equipment, computer-aided design, robotics and computer-related techniques were proven to increase productivity, reduce costs and improve product quality," the analysts noted.

Backing up their own findings, the researchers found that industry experts claim that technology can account for as much as a 60 pct plant productivity increase.

Mr. Drucker is one such expert making that claim. He stated that automation, when installed in a manufacturing plant, has paid for itself within three years, "and often much faster."

Still, a major finding of the TMC study was that U.S. manufacturers were showing "a widespread unwillingness" to use the modern manufacturing equipment and techniques.

"Throughout the project," it was noted in the report, "the most common excuse used by companies for not using advanced manufacturing technologies was that they were too expensive. Further research, however, indicated that manufacturers were not using them more extensively because they did not understand their advantages and benefits and were generally fearful of computer-based manufacturing techniques."

So, right at step No.1 in boosting equipment productivity—getting and using the best equipment—there is an apparent block among many manufacturers.

Right Setting Needed

In addition, the TMC study found that even with new equipment on line, many companies failed to boost productivity.

Two reasons were cited: First, some companies failed to consider overall corporate manufacturing strategy when they acquired their equipment.

Secondly, many companies sought to install equipment in plants that had not been brought up to full speed in terms of efficiency; the best of equipment cannot be productive in an inefficient plant setting.

"Inefficient use of new technologies," stated the study, "has usually resulted because, for the most part, they have been acquired without regard to their role in an overall manufacturing strategy. Unlike marketing or financial plans which most companies generate annually, less than 10 pct of the firms surveyed had developed a plan for the acquisition or use of computers or technology in their companies.

"This lack of planning has created 'islands of automation,' sophisticated islands of technology acquired at random, scattered on shop floors with little regard to their role in producing a better product. This has ... in many instances ... created problems which have had a negative impact on productivity."

Even with good corporate planning prior to purchase of new equipment, there is another often-seen block to gains in equipment productivity.

In essence, noted the report, the new technologies are only a tool, a computer-aided way to do the things always recognized as necessary to run an efficient factory. If management is not running an effective factory, no amount of computer automation is going to help.

"If the industrial engineering is sloppy, if the standards are loose, if the layout is poor, if the production planning and control systems are not up to the standards of today's best practices, if the product designs are inefficient—then simply computerizing the manufacturing process is unlikely to help substantially."

In sum, what the experts seem to be saying is that manufacturing companies cannot do much in a direct sense, about business cycles that lead to reduced shop work volume and crimp productivity of their equipment. But there are steps manufacturers can take to cushion the impact of down-cycles on their companies. Steps to boost productivity of equipment play a key role. ☐

PRICE & PRODUCTION DATA

(Effective January 27 1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	189	185	157	154
Pittsburgh	199	202	149	189
Youngstown	108	98	81	76
Lake Erie	127	131	107	120
Detroit	143	179	129	122
Chicago	513	501	454	392
Cincinnati	98	95	66	83
St. Louis	74	77	95	76
Southern	224	228	166	163
Western	67	59	67	53
U.S. Production	1,764	1,779	1,441	1,459

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe [illegible]

[illegible]

Pellets (per iron unit natural) gross ton $58.0[illegible]

Pellets (per iron unit natural) gross ton $59.4**

Pellets (per iron unit natural) gross ton 72.5-86.9***

Mesabi, regular-unscreened gross ton $32.53

Mesabi, non-bessemer gross ton $30.03-31.83

[illegible]

STEEL PRODUCTION, COMPOSITE PRICES

(Effective January 27 1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,764	1,779	6,135	5,324
Capability Utilization Rate	70.7	71.3	68.8	57.6

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢ per lb.—eff. 1/1/86)	24.607	24.607	27.582	27.582
Pig Iron** (Net ton = 2000 lbs)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs)	$ 73.50	$ 73.50	$ 72.17	$ 81.50
No. 2 bundles	$ 52.83	$ 52.83	$ 51.17	$ 53.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 73.50	$ 73.50	$ 72.50	$ 83.50
No. 1 steel, Philadelphia	72.50	72.50	71.50	80.50
No. 1 steel, Chicago	74.50	74.50	72.50	80.50
No. 1 bundles, Detroit	70.50	70.50	67.50	75.50
Low Phos., Youngstown	73.50	73.50	71.50	72.50
No. 1 machinery cast, Pgh.	68.50	68.50	68.50	66.50
No. 1 machinery cast, Phila.	92.50	92.50	91.50	98.50
No. 1 machinery cast, Chi.	104.50	104.50	104.50	111.50

[illegible]

NONFERROUS PRICES

(Effective January 27 1986) [illegible]

Primary Metal Prices

[illegible]	[illegible]	[illegible]	[illegible]
Aluminum (LME)	50.33	52.41	[illegible]
Copper (C)	66.50 71.00	66.00 71.00	[illegible]
Lead	18.00 19.00	18.50 19.50	[illegible]
Magnesium Ingot	153.00	148.00	[illegible]
Nickel (LME)	178.21	183.88	[illegible]
Zinc	35.00	[illegible]	[illegible]

*ALUMINUM: [illegible]

Antimony, American (Laredo, Texas)	$2.00
Beryllium-aluminum 5% Be per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.25-1.30
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electic	$4.62
Cobalt 99% cathode	$11.70
Gold per troy oz	$356.40
Indium, dollars per troy oz	$2.50
Iridium, dollars per troy oz	$430.00
Magnesium sticks, 10,000 lbs	$2.02
Mercury, per 76-lb. f.o.b. N.Y.	$290.00-310.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.00-3.13
Palladium, per troy oz	$104.00
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	$6.195
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	$4.00
[illegible]	[illegible]

[illegible]

Straits Tin Price

[illegible]

[illegible] 20—TRADING [illegible]

[illegible] 21—SUSPENDED [illegible]

[illegible] 22 [illegible]

Scrap Prices
Brass Mill Scrap

[illegible]

	Solids	Turnings
Copper	[illegible]	[illegible]
Yellow brass	[illegible]	[illegible]
Red brass	[illegible]	[illegible]
Comm. bronze	[illegible]	[illegible]
Mang. bronze	44	[illegible]
Free cutting rod ends	47	[illegible]

Custom Smelters Scrap

[illegible]

No. 1 copper wire	[illegible]
No. 2 copper wire	[illegible]
Light copper	[illegible]

Ingot Makers Scrap

[illegible]

No. 1 copper wire	[illegible]
No. 2 copper wire	[illegible]
Light copper	[illegible]
No. 1 composition	[illegible]
No. 1 comp. turnings	[illegible]
Hvy. yellow brass solids	[illegible]
Hvy. yellow brass turnings	26
Radiators	35

[illegible]		
[illegible]	36	38
[illegible]	[illegible]	36
[illegible]	[illegible]	36
[illegible]	[illegible]	36

Dealers' Scrap

[illegible]

Aluminum

[illegible]	[illegible]	28
[illegible]	[illegible]	25
[illegible]	[illegible]	23
[illegible]	[illegible]	19
[illegible]	25	26

Copper and Brass

No. 1 copper wire	47	48
No. 2 copper wire	39	40
Light copper	[illegible]	33
Radiators	[illegible]	32
No. 1 composition	[illegible]	41
No. 1 composition turnings	[illegible]	28
[illegible]	[illegible]	30
[illegible]	[illegible]	28
Brass Pipe	28	29
[illegible]	[illegible]	40

Lead

Heavy soft lead	[illegible]	7
[illegible]	[illegible]	3
Type metals	[illegible]	17
[illegible]	[illegible]	14

Nickel

Nickel [illegible]	[illegible]	120
Nickel [illegible]	[illegible]	120
Nickel [illegible]	[illegible]	120
Nickel [illegible]	[illegible]	35

Zinc

New zinc clippings	15	16
Old diecast zinc	[illegible]	13

EFFECTIVE JANUARY 27, 1986

[illegible]

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ [illegible] to	$ [illegible]
No. 2 hvy. melting	[illegible] to	[illegible]
No. 1 dealer bundles	[illegible] to	[illegible]
No. 1 factory bundles [illegible]	[illegible] to	[illegible]
No. 2 bundles	[illegible] to	[illegible]
No. 1 busheling	[illegible] to	[illegible]
Machine shop turnings	[illegible] to	[illegible]
Shoveling turnings	[illegible] to	[illegible]
Cast iron borings	[illegible] to	[illegible]
Low phos. [illegible]	[illegible] to	[illegible]
Heavy turnings	[illegible] to	[illegible]
No. 1 RR hvy. melting	[illegible] to	[illegible]
Rails 2 ft. and under	[illegible] to	[illegible]
[illegible]	[illegible] to	[illegible]
RR [illegible]	[illegible] to	[illegible]
No. 1 machinery cast	[illegible] to	[illegible]
Cupola cast	[illegible] to	[illegible]
Heavy breakable cast	[illegible] to	[illegible]
Stainless		
18-8 [illegible]	[illegible] to	[illegible]
18-8 turnings	[illegible] to	[illegible]

Chicago

No. 1 hvy. melting	$ [illegible] to	$ [illegible]
No. 2 hvy. melting	[illegible] to	[illegible]
No. 1 dealer bundles	[illegible] to	[illegible]
No. 1 factory bundles	[illegible] to	[illegible]
No. 2 dealer bundles	[illegible] to	[illegible]
No. 1 busheling	[illegible] to	[illegible]
Shredder scrap	[illegible] to	[illegible]
Machine shop turnings	[illegible] to	[illegible]
Mixed borings and turnings	[illegible] to	[illegible]
[illegible]	[illegible] to	[illegible]
Cast iron borings	[illegible] to	[illegible]
Low phos. [illegible]	[illegible] to	[illegible]
Low phos. [illegible]		
[illegible]	[illegible] to	[illegible]
Low phos. 2 ft. and under	[illegible] to	[illegible]
No. 1 RR hvy. melting	[illegible] to	[illegible]
[illegible]	[illegible] to	[illegible]
[illegible]	[illegible] to	[illegible]
[illegible]	[illegible] to	[illegible]
RR [illegible]	[illegible] to	[illegible]
RR [illegible]	[illegible] to	[illegible]
No. 1 machinery cast	[illegible] to	[illegible]
Cupola cast	[illegible] to	[illegible]
Stove plate	[illegible] to	[illegible]
Steel car wheels	[illegible] to	[illegible]
Stainless		
18-8 bundles	[illegible] to	[illegible]
18-8 turnings	[illegible] to	[illegible]
430 bundles and solids	[illegible] to	[illegible]
430 turnings	[illegible] to	[illegible]

Philadelphia

No. 1 hvy. melting	$ [illegible] to	$ [illegible]
No. 2 hvy. melting	[illegible] to	[illegible]
No. 1 dealer bundles	[illegible] to	[illegible]
No. 2 dealer bundles	[illegible] to	[illegible]
No. 1 busheling	[illegible] to	[illegible]
Shredder scrap	[illegible] to	[illegible]
Machine shop turnings	[illegible] to	[illegible]
Mixed borings and turnings	[illegible] to	[illegible]
Shoveling turnings	[illegible] to	[illegible]
Low phos. 2 ft. and under	[illegible] to	[illegible]
Low phos. [illegible]	[illegible] to	[illegible]
Electric furnace bundles	[illegible] to	[illegible]
RR [illegible]	[illegible] to	[illegible]
Rails 2 ft. and under	[illegible] to	[illegible]
Cupola cast	[illegible] to	[illegible]
Heavy breakable cast	[illegible] to	[illegible]
No. 1 machinery cast	[illegible] to	[illegible]

Detroit

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ [illegible] to	$ [illegible]
No. 2 hvy. melting	[illegible] to	[illegible]
No. 1 dealer bundles	[illegible] to	[illegible]
No. 2 bundles	[illegible] to	[illegible]
No. 1 busheling	[illegible] to	[illegible]
Drop forge flashings	[illegible] to	[illegible]
Machine shop turnings	[illegible] to	[illegible]
Mixed borings and turnings	[illegible] to	[illegible]
Shoveling turnings	[illegible] to	[illegible]
Cast iron borings	[illegible] to	[illegible]
Heavy breakable cast	[illegible] to	[illegible]
Mixed cupola cast	[illegible] to	[illegible]
Automotive cast	[illegible] to	[illegible]
Stainless		
18-8 bundles and solids	[illegible] to	[illegible]
18-8 turnings	[illegible] to	[illegible]
430 bundles and solids	[illegible] to	[illegible]

Youngstown

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 60.00 to	$ 61.00
No. 2 hvy. melting	56.00 to	57.00
No. 1 dealer bundles	77.00 to	78.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turnings	22.00 to	23.00
Shoveling turnings	[illegible] to	[illegible]
[illegible] plate	73.00 to	74.00
Electric furnace bundles	[illegible] to	[illegible]
[illegible] bundles	[illegible] to	[illegible]

Cleveland

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ [illegible] to	$ [illegible]
No. 2 hvy. melting	[illegible] to	[illegible]
No. 1 dealer bundles	[illegible] to	[illegible]
No. 1 factory bundles	[illegible] to	[illegible]
No. 2 bundles	[illegible] to	[illegible]
No. 1 busheling	[illegible] to	[illegible]
Machine shop turnings	[illegible] to	[illegible]
Shoveling turnings	[illegible] to	[illegible]
Cast iron borings	[illegible] to	[illegible]
Cut structural & plate		
[illegible]	[illegible] to	[illegible]
Cut structural & plate		
[illegible]	[illegible] to	[illegible]
[illegible]	[illegible] to	[illegible]
[illegible]	[illegible] to	[illegible]
No. 1 RR hvy. melting	[illegible] to	[illegible]
Rails [illegible]	[illegible] to	[illegible]
Rails [illegible]	[illegible] to	[illegible]
No. 1 machinery cast	[illegible] to	[illegible]
[illegible]	[illegible] to	[illegible]
Stainless		
18-8 bundles	[illegible] to	[illegible]
18-8 turnings	[illegible] to	[illegible]
430 [illegible]	[illegible] to	[illegible]

Buffalo

[illegible]

No. 1 hvy. melting	$ [illegible] to	$ [illegible]
No. 2 hvy. melting	[illegible] to	[illegible]
No. 1 busheling	[illegible] to	[illegible]
No. 1 dealer bundles	[illegible] to	[illegible]
No. 2 bundles	[illegible] to	[illegible]
Machine shop turnings	[illegible] to	[illegible]
Mixed borings and turnings	[illegible] to	[illegible]
[illegible]	[illegible] to	[illegible]
Cast iron borings	[illegible] to	[illegible]
Low phos. plate	[illegible] to	[illegible]
[illegible]		
[illegible]	[illegible] to	[illegible]
Rails [illegible]	[illegible] to	[illegible]
[illegible]	[illegible] to	[illegible]
No. 1 machinery cast	[illegible] to	[illegible]
No. 1 cupola cast	[illegible] to	[illegible]

St. Louis

No. 1 hvy. melting	$ [illegible] to	$ [illegible]
No. 2 hvy. melting	[illegible] to	[illegible]
[illegible]	[illegible] to	[illegible]
No. 1 dealer bundles	[illegible] to	[illegible]
No. 2 bundles	[illegible] to	[illegible]
Machine shop turnings	[illegible] to	[illegible]
Shoveling turnings	[illegible] to	[illegible]
Cast iron borings	[illegible] to	[illegible]
No. 1 RR hvy. melting	[illegible] to	[illegible]
Rails, random length	[illegible] to	[illegible]
Rails [illegible]	[illegible] to	[illegible]
RR specialties	[illegible] to	[illegible]
Cupola cast	[illegible] to	[illegible]
Heavy breakable cast	[illegible] to	[illegible]
Stove plate	[illegible] to	[illegible]
Steel car wheels	[illegible] to	[illegible]
Rerolling rails	[illegible] to	[illegible]
Unstripped motor blocks	54.00 to	55.00

Birmingham

No. 1 hvy. melting	$ [illegible] to	$ [illegible]
No. 2 hvy. melting	[illegible] to	[illegible]
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	47.00 to	48.00
No. 1 busheling	72.00 to	73.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	[illegible] to	[illegible]
Shoveling turnings	40.00 to	41.00
Cast iron borings	39.00 to	40.00
Electric furnace bundles	[illegible] to	65.00
Elec. furnace, 3 ft. & under	67.00 to	68.00
Structural and plate, 2 ft.	90.00 to	91.00
Structural and plate, 4 ft.	87.00 to	88.00
No. 1 RR hvy. melting	87.00 to	88.00
Scrap rails, random lgth.	74.00 to	75.00
Rails, 2 ft. and under	90.00 to	91.00
Angles and splice bars	87.00 to	88.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	74.00 to	75.00

Cincinnati

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	61.00 to	62.00
Rails, random length	64.00 to	65.00
Rails 2 ft. and under	79.00 to	80.00
No. 1 cupola cast	66.00 to	67.00
Heavy breakable cast	27.00 to	28.00
Drop broken cast	72.00 to	73.00

New York

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	445.00 to	465.00
18-8 turnings	340.00 to	365.00
410 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	65.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	35.00 to	37.00
No. 1 dealer bundles	32.00 to	34.00
No. 2 dealer bundles	20.00 to	22.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	30.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	11.00 to	12.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace 1 ft. and under (foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	55.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 81.00
No. 2 hvy. melting, cut 2 ft. and under	72.00
No. 1 dealer bundles	86.00
No. 2 bundles	61.00
Mixed steel scrap	59.00
Bush., new fact., prep'd	81.00
Bush., new fact., unprep'd	64.00
Machine shop turnings	34.00
Short steel turnings	34.00
Mixed borings and turnings	19.00
Cast scrap	89.00

Houston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	57.00 to	58.00
No. 2 bundles	42.00 to	43.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	30.00 to	31.00
Shredder scrap	79.00 to	80.00
Cut structural plate, 2 ft. and under	101.00 to	102.00
Cut structural plate, 5 ft. and under	83.00 to	84.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	85.00 to	86.00

PRICES CONTINUE TO WALK A TREADMILL

A few short years ago (1979-80), some economists worried that the country would have to learn to live with high inflation rates. Inflation, they said, would be the great economic nemesis of the 1980s, 1990s and perhaps beyond.

Well, three full years have passed with little inflation. In the period 1983-85, for example, producer prices have gone up by 0.6 pct, 1.7 pct, and last year by 1.8 pct. That's the lowest price gain for any three-year period since the mid-1960s.

And, it didn't take a recession to force the price wring-out. Over that three-year span, the U.S. economy grew by a strapping 13 pct.

In short...Yes, Virginia, there can be growth without inflation.

Last year closed on a continuing note of low price numbers. A good example is seen in the table here. In December, prices for five of the product lines fell from the previous month. Also, nine of the product lines showed no month-to-month price changes. And, prices in four product lines moved up by only 0.1 pct. In sum, 18 of 22 product groups showed little or no upward price pressures in December.

There seems to be little on the horizon to threaten this near inflation-free economic environment, at least nothing through much of 1986.

Some economists are sounding a warning bell, though. They note that money supply growth was 12 pct over the past year. If that steamy growth pace continues, they say, it will in time bring on inflation.

Too, they warn, if the Fed reins in on money supply growth, even a little, it will bring on inflation. The reason: The record debt load—of the government, consumers and corporations—would create a demand for rollover funding that could not be met. That also would set inflation in motion.

Latest Month Covered: December 1985

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	395.1	— 0.2	+ 0.2
Metal Forming Machine Tools	437.2	+ 0.9	+ 1.9
Agricultural Machinery & Equip.	337.9	0	+ 0.1
Construction Machinery & Equip.	363.6	0	+ 1.6
Industrial Process Furnace & Ovens	391.8	— 0.1	+ 3.1
Industrial Material Handling Equip.	296.0	+ 0.5	+ 1.3
Pumps, Compressors & Allied Equip.	359.5	0	+ 2.1
Fluid Power Equip. (Dec. 1970 = 100)	265.6	+ 0.1	+ 1.4
Mechanical Power Transmission Equip.	339.0	0	+ 2.5
Automobiles	232.5	— 0.9	+ 3.5
Motor Trucks—Light	312.6	0	+ 8.0
Motor Trucks—Heavy	335.2	0	+ 8.5
Railroad Equipment	364.4	+ 0.1	+ 1.5
Fabricated Metal Structural Products	315.4	0	+ 0.7
Electric Motors	351.0	0	+ 2.6
Valves & Fittings (Dec. 1982 = 100)	105.3	+ 0.2	+ 2.4
Ball & Roller Bearings	353.2	— 0.3	+ 2.2
Cutting Tools & Accessories	287.4	+ 0.1	+ 1.4
Heating Equipment	262.2	+ 0.3	+ 2.3
Plumbing Fixtures & Brass Fittings	314.7	— 0.1	+ 1.7
Metal Containers	361.4	+ 0.9	+ 1.2
Miscellaneous Metal Products	302.4	0	+ 0.2

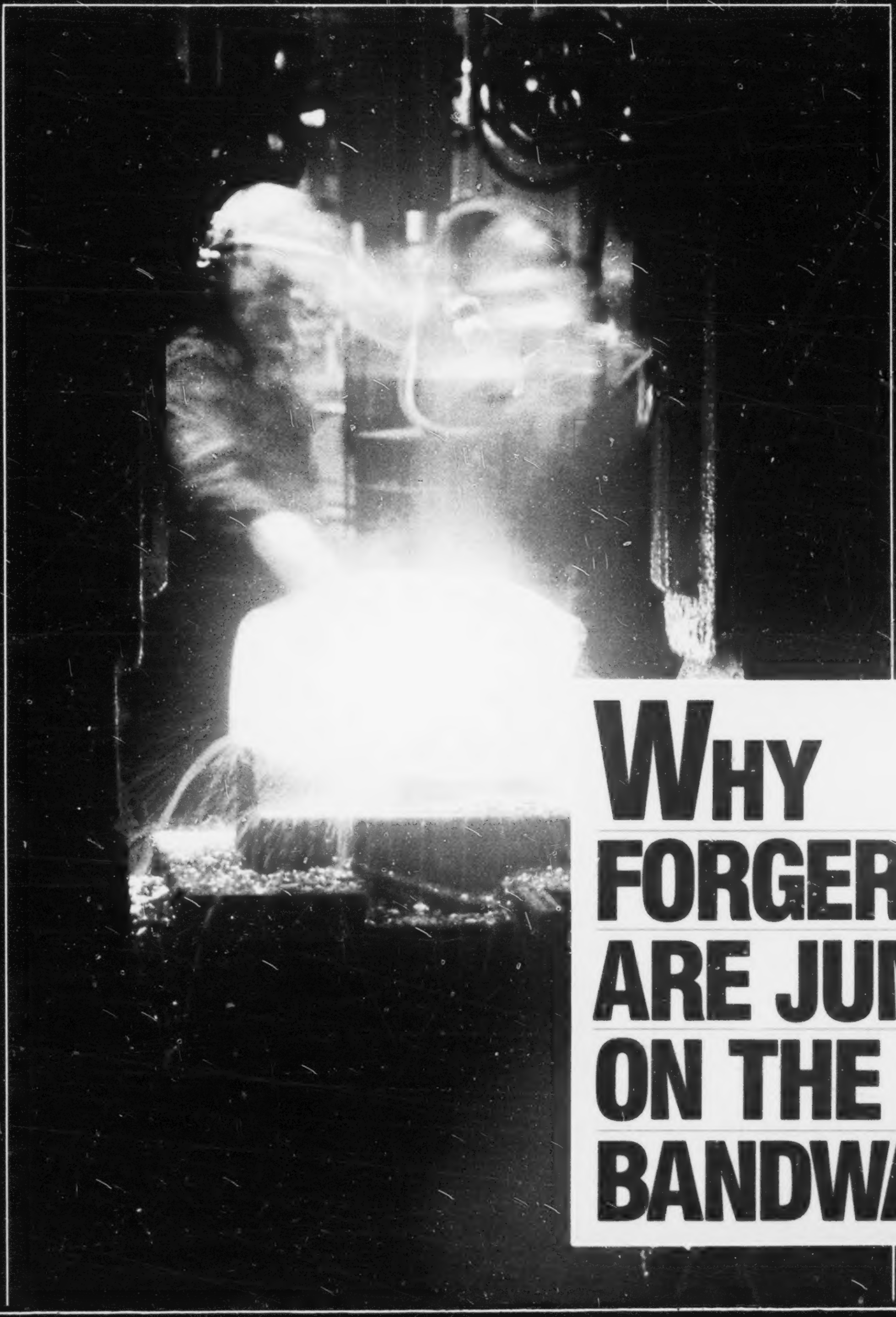
Data based on U.S. Labor Dept.'s Producer Price Index

CHILTON'S

March 7, 1986

IRON AGE

MANUFACTURING MANAGEMENT



MANAGERS: HELP YOURSELF TO JOB SECURITY

THE THROW-AWAY PC

WHY FORGERS ARE JUMPING ON THE SPC BANDWAGON

MARCH 7, 1986 VOL. 229, NO. 5

CHILTON'S
IRON AGE
MANUFACTURING MANAGEMENT

Editorial 7
What other industry can make this statement?

Newswatch 11
National Steel starts up its new electrogalvanizing line.

Machine Tool Report 21
Maho's new plant: practicing what is preached.

Forging 25
Jumping on the statistical process control bandwagon.

Job Demand 29
Middle managers: Check all openings, even look far afield.

Throwaway PC 39
Small, inexpensive programmable controllers have arrived.

Employee Education 45
Corporations can't afford to stint on training costs.

Technically Speaking 49
A test system that monitors the growth of cracks.

Materials Report 57
Sheet demand provides some price firmness.

Order Trends 68
Total orders look good, but.....

Next Issue: Engineering plastics

Departments

EDITORIAL STAFF 8
LETTERS 8
INDUSTRY BRIEFS 18
PRODUCT & EQUIPMENT REVIEW 50
AD INDEX 58
BUSINESS STAFF 58
MANAGEMENT SERVICE CARD 59
P&P DATA 2/10 61
FERROUS SCRAP 2/10 63
STEEL PRICES 64
CLEARING HOUSE 66

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year, $85 Canada, Foreign (24 issues). Metalproducing edition: $30 one year, $56 Canada, Foreign (12 issues). Single copies: $3.00. Cables: Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 3017, Wheaton, IL 60189.

Chilton abc
ONE OF THE ABC PUBLISHING COMPANIES

CORPORATE EDUCATION IS NOT ON A DIET

Companies may be running lean and mean these days, but that doesn't mean they are slimming down their training programs.

BY PATRICIA S. AIMAN

The unskilled or uneducated worker may soon face the same fate as the dodo bird—extinction.

Companies are going to great lengths to educate and train their workers. In short, corporate education is very big business in itself and an ever growing part of the corporate world.

It's estimated that U.S. corporations spend more than $40 billion a year on employee education. More than 80 organizations have been established just to train executives.

Meanwhile, business schools that looked with disdain at those 'lightweight' management courses a few years back may now be sponsoring them—charging $100 to $800 per day per person. And a new breed of business evangelist is on the scene, traveling from company to company to stir up executive adrenalin, while commanding $10,000 or more for a 90-minute speech.

So, added to traditional seminars, conferences, workshops and "nice to know" sessions, employees are finding the surge in hand-ons, technological training juxtapositioned by some unusual educational practices.

Executives tell of play-acting or surviving in the woods and whitewater rafting to develop teamwork and peer trust. Others brainstorm at summer camp, or attempt to get their creative juices flowing by imitating animal noises.

Harry or Martha in accounting may regard such behavior as something new in 'voodoo economics,' but a number of *Fortune 500* companies find the sessions irresistible, and worthwhile in pursuing improved productivity and profits and fending off foreign competition.

The New York-based Conference Board, with financial assistance from the Student Loan Marketing Association (Sallie Mae), has tracked corporate education and training during the past five years.

Its survey, *Trends in Corporate Education and Training*, conducted by Seymour Lusterman among some 218 major companies, indicated an increasing number of employees in all major job categories are undergoing formal training—even in companies forced to make cutbacks in their workforce.

But this was apparent in the hard-pressed days of 1982, when a *Journal of Commerce* survey found that few companies planned to reduce their training budgets. Nearly half the survey respondents said their educational appropriations doubled from 1975 to 1982, and 80 pct said they planned to spend 30 pct more in 1983 than in 1982. That trend continues.

But are these corporate appropriations helping the bottom line? Apparently.

The Conference Board report indicated that more companies are using their programs effectively by linking them closer to overall corporate strategy.

Motorola, Inc., Schaumburg, Ill., seems convinced of the direct link between workforce training and corporate strategic goals. All training must be job-related and applied throughout the company (not on a limited basis). Also, training must be treated as a dual investment—in people and in the business.

Another survey respondent talked of the 'arm of corporate strategy' in describing his company's new approach to training: "Education in the past was an incoherent cottage industry in our company. The people who ran it had a constituency that covered their expenses by sending students. Courses proliferated, were redundant and oversegmented. The training department was an internal sales agency, measured by how many courses it sold."

Today, companies such as IBM, Xerox or GE describe their orientation as "needs-driven," seeing their people get the skills that are methodically identified.

Rapidly accelerating technology has delivered a one-two punch to Corporate America. While high tech has become a new form of training tool, it has simultaneously imposed new learning: production managers must understand computer-aided manufacturing, human resources managers depend on computerized information and typists must get proficient on word processors.

But electronic teachers such as computer-aided instruction, interactive video and satellite broadcasting are allowing companies to pace training to individual, not just group, needs.

TV networking, too, has come into its own. Hewlett Packard has been using it for training in new products for sales, service and other support personnel, as well as for engineering education.

Not Moving Fast Enough

Still, the New York-based Work in America Institute (WAI) believes that management may not be moving fast enough to close the breach between 'pell mell' technologies and employee skills. It has undertaken a three-year study, *Training for New Technology*, to determine if that is true. (It should be out next year.)

Warned WAI President Jerome M. Rosow: "Unless training programs grow directly out of the business plan, then training becomes as vital as R&D, or equipment maintenance, or capital investment in new technology."

Nevertheless, the high tech explosion has backfired in some boardrooms. "The field is enormous and complex," explained a human resources-development vice president, "there's nothing you can't do with computer-based training, especially in conjunction with video. But there is a cost—in equipment and needed personnel."

Complained another: "Training has suddenly become so capital intensive, that it has put us in the hot seat. We must choose between alternate modes and models of equipment and risk recommending investments that prove to be unwise—in equipment and systems that quickly become obsolete—or we must recommend against all of them."

Too, rapidly accelerating technology has hung an albatross on some engineers. In the past, they could keep up-to-date by reading books, periodicals or attending university or professional society programs.

Now, the Conference Board estimates that a 25-year-old engineering graduate will have to be re-educated eight times during his or her 40-year career.

The Conference Board also revealed a trend toward the use of more outside instructors and consultants for in-house training programs, and nearly two-thirds of the respondents said they have expanded their education and training staffs over the last five years.

Many companies admit to changing their methods of assessing their training needs; while others noted an increased use of performance-appraisal systems to zero in on the training needs of key employees.

GE reported this shift in training gears: In the past, GE was preoccupied with executive education to the neglect of its first-line managers. But they were responsible for managing about 50 pct of the professional workforce—interviewing and hiring about 90 pct of new employees. Since many of these managers were not equipped to select, motivate or evaluate new personnel, GE instituted a new program for them. Attended by about 1,000 each year, worldwide, it has been described as "strong orientation toward increasing General Electric's competitiveness as well as focusing on traditional 'one-over-one' skills."

While heightened global competition, deregulation and other changes in the business environment have been recasting educational program decisions, a steel company official said that his corporate approach had changed from a bureaucracy into a more participative, innovative style, with clearly understood goals.

Other corporate officials cite competencies—intrapreneurial, marketing and others—that entail a blend of skill and knowledge and represent "new ways of thinking."

Of course, workplace training was on the agenda when the Conference Board projected its human resources outlook for 1986.

During that meeting in New York, Anthony P. Carnavele, chief economist of the American Society for Training and Development, emphasized that "workplace training can be a powerful lever for resolving many of the nation's economic and human problems," and urged much more spending on training and retraining—particularly down through the ranks.

How Much Industries Spent on Training In 1984

Industry	Average Spent per Employee
Mining	$566
Construction	127
Durable Goods	314
Nondurable Goods	260
Primary Metals	283
Machinery	430
Electrical Equipment	371
Aircraft	425
Instruments	484
Chemicals	405
Transportation	490

Source: Anthony P. Carnavele, American Society for Training and Development

Meanwhile, plant closings and worker layoffs are reinforcing this need, as unions clamor for more worker educational programs to keep employees updated on technological advances and sufficiently skilled to fill vacated positions.

Last year, to entice more companies to train or retrain, H.R. 1219, the National Training Incentives Act, was reintroduced by a bipartisan group in the House.

The bill provides employers with a 25 pct tax credit for training expenses over a five-year average—thus rewarding the type of retraining and on-the-job-training—and permitting workers to finance retraining with money withdrawn, without penalty or taxation from their IRA or annuity accounts.

As U.S. industry reaches out for greater productivity and an international competitive advantage, its education and training programs will continue to gain ground. Corporate strategies and teaching methods differ, but the trend in education is headed in one direction—up. ☐

PRICE & PRODUCTION DATA

(Effective February 10, 1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	202	179	181	163
Pittsburgh	219	206	219	198
Youngstown	110	112	101	101
Lake Erie	137	130	122	151
Detroit	141	141	128	134
Chicago	501	509	487	456
Cincinnati	101	100	86	87
St. Louis	77	72	73	71
Southern	210	227	200	173
Western	89	87	83	85
U.S. Production	1,787	1,763	1,700	1,619

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8/13/85. **59.4¢—Pickands Mather, 6/1/85 delivered hold of vessel, upper lake ports. ***72.5¢—U.S. Steel as of 8/16/85; 86.9¢—Oglebay Norton 3/25/82, Hanna Mining and Cleveland Cliffs, 2/26/82

STEEL PRODUCTION, COMPOSITE PRICES

(Effective February 10, 1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,787	1,763	9,685	8,533
Capability Utilization Rate	71.6	70.7	69.7	59.2

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 1/1/86)	24.607	24.607	24.607	27.582
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 75.50	$ 75.50	$ 73.17	$ 82.50
No. 2 bundles	$ 53.83	$ 53.83	$ 52.83	$ 54.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 76.50	$ 76.50	$ 73.50	$ 86.50
No. 1 steel, Philadelphia	72.50	72.50	71.50	80.50
No. 1 steel, Chicago	77.50	77.50	74.50	80.50
No. 1 bundles, Detroit	70.50	70.50	70.50	75.50
Low Phos., Youngstown	76.50	76.50	73.50	72.50
No. 1 mach'y cast., Pgh	68.50	68.50	68.50	71.50
No. 1 mach'y cast., Phila	93.50	92.50	92.50	98.50
No. 1 mach'y cast., Chi	109.50	109.50	104.50	111.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices of basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective February 10, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	50.22	50.74	2/10/86
Copper (C)	66.50-69.00	67.00-69.00	2/7/86
Lead	17.75-19.00	18.00-19.00	2/10/86
Magnesium Ingot	153.00	148.00	12/9/85
Nickel (LME)	175.80	178.43	2/10/86
Zinc	35.00	38.00	11/6/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.25-1.50
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$340.15
Indium, dollars per troy oz.	$2.50
Iridium, dollars per troy oz.	$430.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb. f.o.b. N.Y.	$265.00-275.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.00-3.13
Palladium, per troy oz.	$98.00
Platinum, per troy oz.	$356.00
Rhodium, per troy oz.	$1,090.00
Silver ingots, per troy oz.	$5.91
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd. red.	$9.00-9.50
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

Feb. 3—331.16
Feb. 4—327.56
Feb. 5—322.28
Feb. 6—317.15
Feb. 7—316.22

Scrap Prices
Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	63	52
Yellow brass	53⅛	46
Red brass	57¾	49½
Comm. bronze	59½	50½
Mang. bronze	44	43¼
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	58
No. 2 copper wire	51
Light copper	42

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	54
No. 2 copper wire	47
Light copper	38
No. 1 composition	46
No. 1 comp. turnings	45
Hvy. yellow brass solids	29
Hvy. yellow brass turnings	26
Radiators	35

Aluminum

New mixed clips	36	— 38
Old sheet	35	— 36
Old cast	35	— 36
Clean dry borings	35	— 36

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	27	— 28
Mixed L.C. clips	23	— 25
Old sheets and cast	22	— 23
Borings and turnings	17	— 19
Duraluminum clippings	25	— 26

Copper and Brass

No. 1 copper wire	46	— 47
No. 2 copper wire	39	— 40
Light copper	32	— 33
Radiators	31	— 32
No. 1 composition	39	— 41
No. 1 composition turnings	36	— 38
Cocks and faucets	28	— 30
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 16
Old diecast zinc	11	— 13

EFFECTIVE FEBRUARY 10,1986

(Effective February 10 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 76.00 to	$ 77.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	94.00 to	95.00
No. 1 factory bundles (auto)	94.00 to	95.00
No. 2 bundles	49.00 to	50.00
No. 1 busheling	88.00 to	89.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	42.00 to	43.00
Low phos. punchings plate	104.00 to	105.00
Heavy turnings	66.00 to	67.00
No. 1 RR hvy. melting	85.00 to	86.00
Rails, 2 ft. and under	101.00 to	102.00
Scrap rails, random lgth	86.00 to	87.00
RR specialties	96.00 to	97.00
No. 1 machinery cast	68.00 to	69.00
Cupola cast	61.00 to	62.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	525.00 to	535.00
18-8 turnings	425.00 to	435.00

Chicago

No. 1 hvy. melting	$ 77.00 to	$ 78.00
No. 2 hvy. melting	72.00 to	73.00
No. 1 dealer bundles	98.00 to	99.00
No. 1 factory bundles (auto)	95.00 to	96.00
No. 2 dealer bundles	63.00 to	64.00
No. 1 busheling	91.00 to	92.00
Shredder scrap	90.00 to	91.00
Machine shop turnings	42.00 to	43.00
Mixed borings and turnings	43.00 to	44.00
Shoveling turnings	45.00 to	46.00
Cast iron borings	52.00 to	53.00
Low phos. forge crop	102.00 to	103.00
Low phos. punchings plate 1/4 in. and heavier	117.00 to	118.00
Low phos. 2 ft. and under	111.00 to	112.00
No. 1 RR hvy. melting	83.00 to	84.00
Scrap rails random lgth	86.00 to	87.00
Reroller rails	105.00 to	106.00
Rails, 2 ft. and under	106.00 to	107.00
RR couplers and knuckles	93.00 to	94.00
RR car axles	108.00 to	109.00
No. 1 machinery cast	109.00 to	110.00
Cupola cast	94.00 to	95.00
Stove plate	97.00 to	98.00
Steel car wheels	99.00 to	100.00
Stainless		
18-8 uundles and solids	485.00 to	495.00
18-8 turnings	395.00 to	405.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 71.00 to	$ 74.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	87.00 to	90.00
No. 2 dealer bundles	47.00 to	50.00
No. 1 busheling	84.00 to	87.00
Shredder scrap	83.00 to	86.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	77.00 to	80.00
Low phos. 2 ft. punchings	97.00 to	100.00
Electric furnace bundles	93.00 to	96.00
RR specialties	77.00 to	80.00
Rails, 2 ft. and under	100.00 to	103.00
Cupola cast	84.00 to	87.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 bundles	30.00 to	31.00
No. 1 busheling	69.00 to	70.00
Drop forge flashings	45.00 to	46.00
Machine shop turnings	35.00 to	36.00
Mixed borings and turnings	14.00 to	15.00
Shoveling turnings	35.00 to	36.00
Cast iron borings	19.00 to	20.00
Heavy breakable cast	35.00 to	36.00
Mixed cupola cast	50.00 to	51.00
Automobile cast	73.00 to	74.00
Stainless		
18-8 bundles and solids	475.00 to	485.00
18-8 turnings	345.00 to	355.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 61.00 to	$ 62.00
No. 2 hvy. melting	58.00 to	59.00
No. 1 dealer bundles	79.00 to	80.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	23.00 to	24.00
Low phos. plate	76.00 to	77.00
Electric furnace bundles	66.00 to	67.00
Galvanized bundles	64.00 to	65.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 59.00 to	$ 60.00
No. 2 hvy. melting	57.00 to	58.00
No. 1 dealer bundles	83.00 to	84.00
No. 1 factory bundles	74.00 to	75.00
No. 2 bundles	35.00 to	36.00
No. 1 busheling	73.00 to	74.00
Machine shop turnings	28.00 to	29.00
Shoveling turnings	28.00 to	29.00
Cast iron borings	19.00 to	20.00
Cut structural & plates, 5 ft. and under	70.00 to	71.00
Cut structural & plates, 2 ft. and under	92.00 to	93.00
Low phos. punchings plate	92.00 to	93.00
Foundry steel, 2 ft. & under	58.00 to	59.00
No. 1 RR hvy. melting	64.00 to	65.00
Rails, 2 ft. and under	93.00 to	94.00
Rails, 18 in. and under	95.00 to	96.00
No. 1 machinery cast	80.00 to	81.00
Mixed cast	47.00 to	48.00
Stainless		
18-8 bundles	480.00 to	490.00
18-8 turnings	350.00 to	360.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 56.00 to	$ 57.00
No. 2 hvy. melting	46.00 to	47.00
No. 1 busheling	72.00 to	73.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	33.00 to	34.00
Machine shop turnings	16.00 to	17.00
Mixed boring and turnings	16.00 to	17.00
Shoveling turnings	22.00 to	23.00
Cast iron borings	24.00 to	25.00
Low phos. plate	79.00 to	80.00
Structural and plate, 2 ft. and under	83.00 to	84.00
Rails, 2 ft. and under	82.00 to	83.00
Scrap rails, random lgth	64.00 to	65.00
No. 1 machinery cast	79.00 to	80.00
No. 1 cupola cast	64.00 to	65.00

St. Louis

No. 1 hvy. melting	$ 78.00 to	$ 79.00
No. 2 hvy. melting	65.00 to	66.00
Foundry steel, 2 ft.	72.00 to	73.00
No. 1 dealer bundles	89.00 to	90.00
No. 2 bundles	59.00 to	60.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	28.00 to	29.00
Cast iron borings	34.00 to	35.00
No. 1 RR hvy. melting	84.00 to	85.00
Rails, random length	74.00 to	75.00
Rails, 18 in. and under	97.00 to	98.00
RR specialties	81.00 to	82.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	91.00 to	92.00
Steel car wheels	90.00 to	91.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	54.00 to	55.00

Birmingham

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	68.00 to	69.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	47.00 to	48.00
No. 1 busheling	72.00 to	73.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	26.00 to	27.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	39.00 to	40.00
Electric furnace bundles	67.00 to	68.00
Elec. furnace, 3 ft. & under	67.00 to	68.00
Structural and plate, 2 ft.	90.00 to	91.00
Structural and plate, 4 ft.	87.00 to	88.00
No. 1 RR hvy. melting	87.00 to	88.00
Scrap rails, random lgth	74.00 to	75.00
Rails, 2 ft. and under	90.00 to	91.00
Angles and splice bars	87.00 to	88.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	74.00 to	75.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	77.00 to	78.00
Rails, random length	64.00 to	65.00
Rails, 2 ft. and under	79.00 to	80.00
No. 1 cupola cast	66.00 to	67.00
Heavy breakable cast	27.00 to	28.00
Drop broken cast	72.00 to	73.00

New York

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	445.00 to	465.00
18-8 turnings	340.00 to	365.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 43.00 to	$ 45.00
No. 2 hvy. melting	37.00 to	39.00
No. 1 dealer bundles	34.00 to	36.00
No. 2 dealer bundles	22.00 to	24.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	18.00 to	20.00
Machina shop turnings	11.00 to	12.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 81.00
No. 2 hvy. melting, cut 2 ft. and under	72.00
No. 1 dealer bundles	87.00
No. 2 bundles	61.00
Mixed steel scrap	59.00
Bush. new fact. prep'd	81.00
Bush. new fact. unprp'd	64.00
Machine shop turnings	34.00
Short steel turnings	34.00
Mixed borings and turnings	19.00
Cast scrap	92.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	57.00 to	58.00
No. 2 bundles	42.00 to	43.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	30.00 to	31.00
Shredder scrap	79.00 to	80.00
Cut structural plate, 2 ft. and under	101.00 to	102.00
Cut structural plate, 5 ft. and under	83.00 to	84.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	85.00 to	86.00

PRODUCER KEY
With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co.
Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Div., National
Steel Corp., Granite City, Ill.
G3 Great Lakes Steel Div., National
Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp.
Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens, Inc., Coatesville, Pa.

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel
Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel
Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston

N4 Northwestern Steel & Wire Co.,
Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Neisen Steel & Wire Co., Chicago
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., North Tonawanda, N.Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Corp., Buffalo, N. Y.

S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago
T10 Tennessee Forging Steel Corp.,
Harriman, Tenn.
T11 Teledyne Columbia-Summerill,
Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh

W3 Weirton Steel Corp., Weirton, W. Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh
Corp., Pittsburgh
W14 Whittar Steel Strip Div., Whittar
Industries, Ltd., Detroit

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based on part of the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
City Delivery Charge*	Hot Rolled 10 gage	Cold Rolled 20 gage	Galvanized 16 gage	Hot Rolled Strip	Plates	Standard Structural	Hot Rolled Merchant	Cold Finished	Hot Rolled 8620 As Rolled	Hot Rolled 4140 Annealed	Cold Drawn 8620 As Rolled	Cold Drawn 4140 Annealed
Atlanta	25.42	32.87	33.16	30.18	26.54	23.92	22.00	31.51	38.29	45.00	60.74	68.31
Baltimore	23.84	28.01	32.99	34.62	28.73	28.22	21.24	33.34	49.07	53.40	62.23	68.45
Birmingham	24.11	29.03	32.65	29.23	25.42	23.07	23.38	31.76	48.64	49.80	60.07	82.19
Boston	35.29	40.89	47.51	39.96	33.99	30.53	26.61	38.98	44.80	49.10	64.63	59.35
Buffalo	30.94	35.56	41.74	32.27	29.31	25.30	21.03	32.43	35.90	42.58	54.95	58.52
Chicago	27.15	32.25	35.76	28.40	23.50	22.05	18.79	27.80	32.89	36.45	41.24	49.18
Cincinnati	25.03	30.03	33.23	26.35	25.53	19.85	19.00	28.18	33.83	38.75	43.05	49.55
Cleveland	29.34	33.48	36.87	27.62	26.15	21.88	19.00	30.30	36.30	42.10	47.85	48.13
Denver	33.60	39.65	41.28	31.73	34.23	27.00	22.18	35.43	39.48	48.58	53.38	60.18
Detroit	25.18	30.13	33.43	26.08	25.20	20.20	18.65	28.38	33.52	38.68	42.98	49.45
Houston	36.55	34.30	38.65	37.40	31.20	23.80	22.18	40.58	43.50	48.13	53.68	61.55
Kansas City	32.58	37.75	41.28	35.32	27.67	25.07	20.97	29.53	35.67	39.97	45.90	51.75
Los Angeles	28.80	34.57	38.40	29.93	33.18	36.37	28.72	42.73	59.60	63.17	64.61	71.79
Memphis	22.37	30.40	31.64	30.20	24.79	23.88	22.08	32.09	33.69	44.20	58.09	64.93
Milwaukee	26.59	31.64	35.09	29.78	24.93	23.01	18.93	27.26	32.83	36.81	41.46	48.61
New York	32.58	38.82	43.90	36.51	31.66	25.04	22.31	31.78	35.48	41.28	49.95	49.70
Philadelphia	28.65	33.78	38.63	36.70	28.73	23.73	20.50	30.80	38.17	44.95	55.23	57.73
Pittsburgh	37.41	40.62	46.44	33.46	35.94	27.19	24.11	29.28	35.43	41.15	47.45	51.60
Portland	25.98	29.47	36.46	31.41	32.56	34.45	27.54	37.58	46.18	51.65	63.57	.....
San Francisco	30.50	36.08	38.63	43.43	35.43	38.18	26.73	46.15	59.38	63.00	64.63	78.13
Seattle	27.78	28.19	29.04	29.92	30.82	31.75	32.00	33.70	34.72	35.17	36.85	65.16
Spokane	20.41	28.65	28.65	32.28	32.02	33.63	23.45	36.94	39.45	42.17	.....	54.16
St. Louis	27.94	37.09	33.62	26.09	25.89	19.68	19.37	29.41	35.53	40.90	47.01	51.72
St. Paul	28.23	33.36	34.92	30.76	25.49	23.51	18.79	28.95	35.35	40.60	46.59	51.59

Base Quantities: All HR products may be combined for quantity. Hot rolled sheet: 10 ga x 36 x 96—120. Cold rolled sheet: 20 ga x 36 x 120. Galv. sheet—16 ga x 36—120. Hot rolled strip—1/8" x 1". Plate 1/4" x 84—. Shapes—I Beams 6 x 12.5. Hot rolled bar—Rounds 3/4-2 15/16. Cold finished bar—C 1018—1" rounds. Alloy bar—Hot rolled 8620—1 5/8" round. Cold drawn—1" round. Hot rolled 4140—1 5/8" round. Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

Codes identify Producers listed on p. 64. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling,	
Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging,	
East	
B3(2)	$473.00
C10	$473.00
Midwest	
W5	$453.00
S1	$473.00
I3	$473.00
C10	$473.00
K2	$473.00
West	
C6	$420.00
Alloy,	
East	
B3	$512.00
C10	$512.00
Midwest	
W5	$492.00
I3	$512.00
C10	$512.00
S1	$512.00
West	
C6	$469.00

Structurals

Carbon,	
East	
B3	23.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3	23.90
T10	23.90
N4	23.90
South	
T10	22.90
High-Strength, Low Alloy,	
East	
B3	23.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
Wide Flange, Carbon,	
East	
B3	20.65
U1	22.75
J3	23.90
Midwest	
U1	22.75
N4	23.90
I3	23.90
Wide Flange, High Strength-Low Alloy,	
East	
U1	24.30
Midwest	
U1	24.30

Strip

Hot Rolled, Carbon, Cut II Edged, all widths	
East	
U1	20.75
B3	20.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3	22.05
W3	22.05
G2, G3	20.75
N4	22.55
W5	23.75
U1	20.75
A7	20.75
I3, B3	20.75
M2	22.05
S1	20.75
Cold Rolled, Carbon Max .25%	
East	
E4	29.75
S10	29.60
P15	24.80
R7	36.20
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05
High Strength, Hot Rolled, Low Alloy, Cut Edge & Mill Edge, All widths, (plus extras)	
Midwest	
M2	22.05
W3	22.05
J3	22.05
G2, G3	20.75
S1	23.75
A7	25.35
High Strength, Cold Rolled, Low Alloy, Mill Edge	
Midwest	
R7	44.65
S1	37.05
Alloy, Hot Rolled,	
Midwest (plus extras)	
S1	26.10
I4	25.20
Alloy, Cold Rolled,	
East (plus extras)	
E4 M8	43.35
B4	49.75
R7	42.95
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot Rolled, Carbon (18 Ga & Heavier)	
East	
B3	20.75
J3	22.05
U1	20.75
Midwest	
M2, W3	22.05
D1	22.05
J3	22.05
G2, G3	20.75
I4	22.45
U1	20.75
S1, B3	20.75
I3	23.75
A7	23.75
W5	23.75
West	
U1	21.25
Cold Rolled, Class I	
East	
B3(2)	25.15
J3	26.15
U1	25.15
Midwest	
W3	26.15
M2	26.15
G2, G3	25.15
M11	25.15
J3	26.15
D1	26.15
U1	25.15
S1	25.15
B3	25.15
I3	28.15
A7	28.15
W5	28.15
West	
U1	25.65
Galvanized (hot dipped),	
East	
B3(2)	27.30
U1	27.30
Midwest	
J3	28.00
D1	28.00
W3	28.00
Y1	28.00
G2, M11	27.30
U1	27.30
S1	30.30
W5	30.30
I3	30.30
A7	30.30
West	
U1	27.80
Enameling,	
Midwest	
U1, S1	26.65
I3	29.65
A7	29.65
J3	27.65
Long Terne,	
Midwest	
W5	31.65
A7	31.65
U1	31.65

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
East	per base box
J3	26.29
U1	30.12
Midwest	
U1	30.12
J3	26.29
M11	28.61
W3	26.29
W5	30.12
West	
U1	30.62
South	
U1	30.12
Double Reduced (55 lb)**	
Midwest	
M11	22.84
J3	21.49
U1	24.33
W3	21.49
W5	24.33
West	
U1	24.83
South	
U1	24.33
Black Plate	
Single Reduced (70 lb)*	
East	
B3	26.55
Midwest	
J3, W3	24.01
I3	24.57
W5	26.55
U1	26.55
M11	27.30
West	
U1	26.55
Double Reduced (55 lb)	
East	
B3	21.32
Midwest	
U1, M11	21.32
W5	21.32
W3, I3	18.93
West	
U1	21.32
South	
U1	21.32

*75 lb — base weight extra 69¢
**60 lb — base weight extra $1.40

Bars

Carbon Steel, Hot Rolled (Special quality)	
East	
R5	25.80
K3	25.80
J3	25.80
C10	27.05
B3	27.05
Midwest	
I4	26.00
I3	27.05
T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
Cold Finished Carbon,	
East	
A11	22.15
T11, S8	31.00
J3(4), L2	31.00
M8, W10	31.00
N1	24.475
R4, B4	33.25
C10	31.00
Midwest	
W10	33.25
J3	31.00
B1	33.45
L2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
South	
J3	31.95
Alloy, Hot-Rolled,	
East	
R5	27.95
K3	27.95
33	29.20
C10	29.20
Midwest	
I3, C10	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold-Drawn,	
East	
L2	35.20
N1	37.90
R4	37.10
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
Midwest	
J3, W10, C10	34.85
B1	37.30
N9, L2	34.85
B5, M9	38.60
South	
J3	35.85

Plates

Carbon Steel,	
East	
B3, U1	18.25
L4	18.25
P2	18.25
J3	26.75
Midwest	
B3, U1	18.25
I3	25.75
J3, A7	22.80
I4	25.75
S1	25.75
West	
U1	18.25
O2	23.00
South	
U1	18.25
Alloy East	
U1	28.55
P2, L4	33.55
J3	34.55
Midwest	
U1	28.55
I4	33.55
West	
O2	31.00
South	
U1	28.55

Wire

Carbon Steel,	
East	
B3	27.10
A11	22.15
Midwest	
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

TOTAL ORDERS LOOK GOOD, BUT ...

New orders for durable goods closed out the year in a burst of glory. At least, the overall figures for December looked good.

Orders in December rose by 4.3 pct from November. That sure looked like good news after order tumbles in four of the previous five months.

But data on orders for December—as is true for much of business data these days—was lopsided. The December gain, a $4.4 billion one, was accounted for entirely-and more-by a $6.1 billion jump in orders for transportation equipment. And most of that big dollar gain was due to a big bunching of orders for commercial aircraft.

Machinery lines offer a good example of the recent mixed state of orders. Orders going to makers of electrical machinery were up 7 pct in December, the strongest month-to-month rise since June.

But producers of nonelectrical machinery saw their orders contract by 12.4 pct in the closing month of the year. This was the third decline in the last four months for this product line.

Notably, December marked the eighth month of a downward trend in inventories held by durable goods producers. This inventory tightening probably more reflects shaky confidence of executives on business and tax law prospects than it does widespread use of new stock control techniques.

The year closed with total durables new orders up 3.7 pct over 1984. After allowing for inflation, that meant that last year was a wash—the same as in 1984.

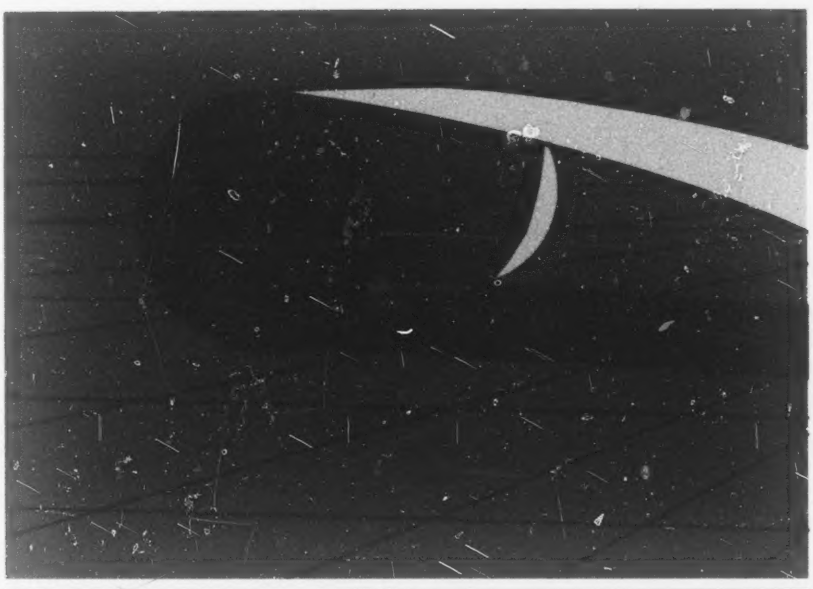
Much of the strength in orders last year was centered in fabricated metal products; these were up 20 pct. Transportation equipment was up almost 6 pct. Machinery and primary metals orders were down a bit.

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted Source: U.S. Dept of Commerce		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	1st Qtr*	$402.1	$389.0	$371.2
Manufacturing, Total	1st Qtr*	154.7	155.7	145.7
Manufacturing, Durable Goods	1st Qtr*	74.6	73.5	69.9
Mining Industry	1st Qtr*	15.8	15.2	15.2
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	Dec.	108.2	103.8	101.3
Shipments	Dec.	106.7	107.0	103.9
Inventories	Dec.	188.8	190.3	191.1
Unfilled Orders	Dec.	352.9	351.3	345.4
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	Dec.	30.6	25.8	26.9
Capital Goods Producers Defense industries	Dec.	6.5	6.8	7.4
Primary Metals, Total	Dec.	10.4	10.6	10.1
Steel (SIC 331)	Dec.	4.1	4.4	4.2
Iron & Steel Castings (SIC 332)	Dec.	1.1	1.6	1.2
Nonferrous Metals	Dec.	5.2	4.6	4.7
Nonelectrical Mach.-Equip. Industries, Total	Dec.	15.8	18.0	16.8
Engines & Turbines	Dec.	1.4	1.6	1.6
Farm Machinery & Equipment (Shipments)	Dec.	0.9	0.9	0.8
Construction, Mining & Mat. Hdlg. Equip	Dec.	2.9	3.0	2.6
General Industrial Machinery	Dec.	1.2	1.5	1.2
Fluid Power Equipment** (index-1972=100)	Dec.	265.0	280.0	231.0
Metalworking Machinery	Dec.	0.8	0.7	1.1
Machine Tools, Total ($Mill., Unadjusted)***	Dec.	177.1	195.1	255.2
Machine Tools, Metalcutting***	Dec.	117.8	171.6	159.1
Machine Tools, Metalforming***	Dec.	59.3	23.5	96.1
Electrical Mach. & Equip. Industries, Total	Dec.	17.4	16.3	15.1
Elec. Transmission Equip. & Ind. Apparatus	Dec.	2.5	2.2	2.4
Household Appliances	Dec.	1.5	1.5	1.5
Communication Equipment	Dec.	5.2	5.5	5.6
Transportation Equipment, Total	Dec.	30.3	24.2	26.7
Motor Vehicles & Parts (Shipments)	Dec.	17.4	18.1	17.4
Aircraft, Missiles & Parts	Dec.	12.0	6.0	8.1
Shipbuilding & Military Tanks	Dec.	0.4	-0.5	0.7
Fabricated Metal Products, Total	Dec.	14.2	15.3	12.8
Instruments, Total	Dec.	5.0	4.8	4.6

*Est.—Commerce Dept. **Source: National Fluid Power Assn.; ***Source: NMTBA

APRIL 4, 1986 VOL. 229, NO. 7

IRON AGE
MANUFACTURING MANAGEMENT



Editorial 7
Is more of the same the game?

Newswatch 15
Detroit is boosting its usage of stainless and galvanized steel.

Service Centers 29
The metal distributors are doing more for their customers.

Second Quarter Forecast 40
This year's economic growth won't be shared by all.

STEEL	43	APPLIANCES	57
NONFERROUS METALS	45	MATERIAL HANDLING	57
AUTOMOTIVE	46	CASTINGS	58
HEAVY EQUIPMENT	46	FORGINGS	58
MACHINE TOOLS	47	WELDING	60
FLUID POWER	47	HEAT TREATING	60
METAL COATINGS	49	FASTENERS	62
PLASTICS	49	STAMPINGS	62
COMPUTERS	52	AIRCRAFT	65
INSTRUMENTS & CONTROLS	52		

Welding 67
Just whose job is weld quality?

Materials Report 89
Steel shipments, operating rates and prices are on the rise.

Order Trends 100
The plodding trend holds for orders.

Next Issue: Fitting Robots into The Factory

Departments

EDITORIAL STAFF 8
LETTERS 8
INDUSTRY BRIEFS 20
PERSONNEL TOUCH 23
PRODUCT & EQUIPMENT REVIEW 80
AD INDEX 90
BUSINESS STAFF 90
MANAGEMENT SERVICE CARD 91
P&P DATA 3/17 94
FERROUS SCRAP 3/17 96
CLEARING HOUSE 98

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year; $85 Canada, Foreign (24 issues). Metalsproducer edition—$30 one year; $56 Canada, Foreign (12 issues). Single copies: $3.00. Cable: Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 3017, Wheaton, IL 60189.

Chilton abc
ONE OF THE ABC PUBLISHING COMPANIES

NOTE

ONLY THE FOLLOWING PAGES OF THIS

PUBLICATION HAVE BEEN FILMED

Cov. 1, p. 3, 46, 50, 52,

64-65, 68.

CHILTON'S

3/20/86
C2150-8

March 20, 1986

IRON AGE
MANUFACTURING MANAGEMENT

THE MANUFACTURING ENGINEER: AUTOMATION'S FORGOTTEN MAN

HOW GLASS REINFORCES THE VALUE OF ENGINEERING PLASTICS

MANAGERS FIND A WAY TO CUT LABOR COSTS

CX014CONGRESSIEN00
SLP86
CONGRESSIONAL INFO SERV /
SRI ACQUISITIONS DIR
4520 EAST WEST HWY
BETHESDA MD 20814

IRONAGE
MANUFACTURING MANAGEMENT

Editorial 7
Who's at fault here?

Newswatch 13
The tax bill will hurt U.S. machine tool industry, says the NMTBA.

You and Your Job 20
Employee drug and alcohol exams 'test' the law.

Manufacturing Engineer 22
Has automation forgotten this key player in manufacturing?

Plastics 27
Glass hikes the value of engineering plastics.

SPC Tools 37
Machine's ability can ruin your statistical process control.

Corporate Restructuring 46
Labor costs are heading down, thanks to massive restructuring.

Technically Speaking 53
Shape memory metal makes linear actuator work.

Materials Report 62
Steel demand is warmer, but hasn't caught fire yet.

Price Trends 68
The price drop routes inflation concerns.

Next Issue: The Changing Role of Service Centers

Departments

EDITORIAL STAFF 8
LETTERS 11
INDUSTRY BRIEFS 18
PRODUCT & EQUIPMENT REVIEW 54
FREE LITERATURE 56
AD INDEX 58
BUSINESS STAFF 58
MANAGEMENT SERVICE CARD 59
P&P DATA 3/3 64
FERROUS SCRAP 3/3 65
CLEARING HOUSE 66

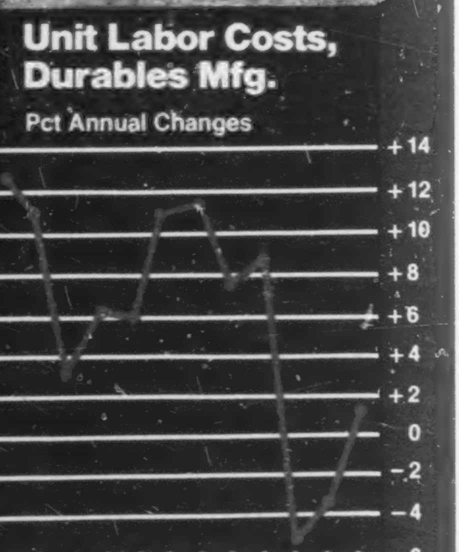
IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sold on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year; $65 Canada/foreign (24 issues). Metalproducer edition—$30 one year; $56 Canada/foreign (12 issues). Single copies, $3.00. Cable: Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 3017, Wheaton, IL 60189.

Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES

LABOR COSTS GET HAMMERED DOWN

A new era of world competition has forced U.S. manufacturers to restructure and become the low-cost producers in their markets. But little progress was made until wage policies were changed.

BY JOHN D. BAXTER



Unit Labor Costs, Durables Mfg.

Pct Annual Changes

Source: U.S. Labor Dept.

The ongoing massive restructuring of U.S. industry has proved to be more painful and protracted than anyone expected. Worse, an increasing number of corporate managers are asking: "Where's the payoff?"

One clear sign of the depth and sweep of the restructuring was noted in a recent Congressional study. The report found that between 1974 and 1984, some 11.5 million workers lost their jobs because of plant shutdowns and relocations.

The study noted that a "large proportion" of the displaced workers were in manufacturing industries. Not surprisingly, at the storm center of the restructuring tempest has been durable goods manufacturing industries. And it's worth noting that metals and metalworking accounts for some 85 pct of that industry sector.

Payoffs to companies from all the restructuring have proved elusive. But it can be said that at least one critically important payoff has now emerged.

Factory labor costs are heading down!

For example, the most basic labor cost in manufacturing—labor cost per unit of output—for the first time in more than two decades, declined for two straight years in 1983 and 1984.

Durables Lead the Way

In the durable goods manufacturing sector, the industry group hit hardest by restructuring, the 5.1 pct decline in unit labor costs in 1983 was by far the steepest for any single year in the entire post-World War II period. And this was followed by a 3.9 pct cost decline in 1984.

There has been little cheering or media drum-beating over this remarkable labor cost decline. That is so, probably, because labor costs in durables manufacturing rose in 1985, albeit, a modest 1.7 pct. That rise is viewed by some labor economists as only a passing thing. It is seen as due chiefly to a cyclical setback in 1985 that caught many companies with rebuilt payrolls after near-boom business volume in the previous year. The U.S. economy grew at only 2.4 pct in 1985 following a year when the U.S. economy grew at the hottest pace (6.6 pct) in 30 years.

"We got caught in a trap play," said one executive. "But I think we are back on course now in putting a lid on our plant costs."

One industrial relations executive hails the turnaround in labor costs as "the best news we have had about manufacturing in this country in a very, very long time."

The 'turnaround' he sees is a 2.4 pct average yearly *decline* in unit labor costs in durables manufacturing for the years 1983-85—compared to a 6.3 pct average *rise* in the years 1974-84.

The Reasons

What, at long last, is bringing about falling unit labor costs?

Top managers in durable goods lines are running the full program of restructuring in trying to strengthen their companies. Many of their varied actions have directly or indirectly helped get labor costs under control.

But real progress didn't seem to come until companies, between 1978 and 1983, made what labor

Higher Productivity Plus Smaller Wage Hikes Equals Lower Unit Labor Costs

Key Labor Measures, Durables Manufacturing

Annual Pct Changes—1974-84 vs 1983-85

	1974-84	1983-85
Productivity	+2.3	+6.5
Compensation	+8.5	+3.8
Unit Labor Costs	+6.3	-2.4

Source: U.S. Labor Dept.

analysts at The Conference Board call a "fundamental change in wage setting policies."

The Conference Board made this point after conducting two near matching surveys (near matching in companies surveyed and in questions asked) of 500 companies, first in 1978, then again in 1983. Within those years, U.S. industry clearly made a major shift to "new patterns" of wage setting.

"Corporations have switched their wage setting policies from imitation of other companies' wage increases, toward internal criteria," noted the board following the 1983 survey. "Under growing competitive pressures, companies now base wage changes on labor cost per unit of output, and on expected profits."

In other words, it has not been simply tougher wage bargaining by management, or less labor union resistance that has produced the recent years' lower unit labor costs. The key is that management has made a fundamental change in setting wage objectives and in the way it bargains.

A Breakthrough

So, in all the restructuring by U.S. industry, it wasn't until it restructured its wage setting practices that real payoffs came in the critical area of factory unit labor costs. Certainly, in all the previous years of industry restructuring, no significant response was seen in labor costs and productivity.

The box describing comparative wage objectives (see p. 52) is based on the board's findings. It makes clear the big shift in wage setting and bargaining.

Note that in 1978, the wage setting objective that held managements' top priority was adherence to industry-wide wage patterns. Management thinking behind this was that if a company paid the same wage scale as its competitors, it was safe; it wouldn't be giving away any labor cost advantage.

Second on the priority list in the 1978 survey, was the setting of company wages according to local labor market conditions and wage rates. At the time, it was felt that this made sense. Companies could set wages at various plants to match local wage levels. Then, it wouldn't lose employees in any area because of wage disparities.

These objectives had little to do with making a company a tougher competitor—at a time when market competition was intensifying by the day. Wages were set as if companies were competing chiefly for workers; actually, the real competition was in the marketplaces.

As one labor consultant, in retrospect, said about these wage setting priorities: "Those policies came from personnel departments, not from the guys trying to keep companies afloat."

A Big Swing

In the 1983 survey management shifted its top priority to setting of wages based on "productivity and labor cost trends in the company." That, as board analysts noted, represents a major shift in management priorities in wage setting objectives.

In the 1983 survey, "expected company profits" rose to second place. Thus, the new top wage policy priorities are aimed directly at a company's own labor cost, productivity and profit situation.

Also, that the top choice in wage setting policy in 1978—industry-wide patterns—came in a poor fourth in the 1983 survey.

Said one analyst, "Since 1983, management thinking in wage setting has been essentially, 'to heck with what the rest of my industry is doing. I have to make sure this particular company survives and prospers. My labor cost and productivity problems are unique. I must deal singularly with them, and not allow industry-wide standards to dictate them.' "

It is considered more than coincidence that since U.S. industry—chiefly durable goods producers—made the major shift to new wage policies, there has also been a major favorable shift in both labor costs and productivity.

The table here on *Key Labor Measures—Durables Manufacturing*—makes very clear the favorable shifts on corporate labor factors. In 1974-84, labor productivity rose at an average annual rate of 2.3 pct, compared to 6.3 pct in 1983-85. In 1974-84, worker pay rose by 8.5 pct a year, compared to 3.8 pct in 1983-85. In 1974-84, unit labor costs *rose* an average 6.3 pct a year, compared to a 2.4 pct *decline* in 1983-85.

Other Forces

It is true that many diverse corporate management policies, other than just wage policies, helped produce these gains on the plant labor front. Also, the growth rate of the economy was stronger in 1983-85. Progress can be made against just about any business problem when times are good.

Some observers give the lion's share of the credit for recent improved labor cost/productivity performance to the cooling of inflation.

There's no denying that inflation accounted for much of the sharp rise in labor costs during the peak inflation years of 1978-81. But it was also a poor productivity showing that hurt badly. After all, any wage is tolerable if productivity is great enough to absorb it. In 1978-81, however, productivity wasn't up to doing that. Output per hour of all persons in durable manufacturing in those years rose a weak average of

Wage Objectives—How Companies Have Shifted Priorities, 1983 vs 1978

Ranked in Order of Priority of More Than 500 Companies

1983	1978
1. Productivity or labor cost trends in this company	1. Industry-wide wage patterns
2. Expected profits of this company	2. Local labor market conditions and wage rates
3. Local labor market conditions and wage rates	3. Expected profits of this company
4. Industry-wide wage patterns	4. Productivity or labor cost trends in this company
5. Consumer price index increases	5. Consumer price index increases
6. Past wage patterns of this company	6. Influence of this wage settlement on others
7. Influence of this wage settlement on others	7. Potential losses from a strike
8. Past benefit patterns of this company	8. Past wage patterns of this company
9. Potential losses from a strike	9. Past benefit patterns of this company
10. National labor market conditions and wage rates	10. Major union settlements in other industries
11. Major union settlements in other industries	11. National labor market conditions and wage rates

Source: The Conference Board

1.2 pct a year. In the 1983-85 period, following the shift to new wage policies, productivity rose an average 6.3 pct a year. Inflation can be one factor; labor costs another.

It was not inflation, but rather the cooling of inflation that spurred management to restructure wage setting policies. Companies could no longer hide their high labor costs and low productivity by simply hiking prices on their products.

One factor that has helped make the new corporate wage policies so effective has been their timing. As the Conference Board surveys show, managers started to make the great swing to the new policies between 1978 and 1983. The timing for the new policies was, in a sense, forced on management by greatly intensified competitive marketplace pressures, much of it foreign in origin.

A case in point: The U.S. trade balance in manufactured goods showed a $20 billion *surplus* as late as 1975. By 1984, this surplus had turned to a $78 billion *deficit*.

The new wage policies, designed to get production costs down and restore competitiveness, went into action at the same time the economy was being choked by back-to-back recessions in 1980-81. These recessions led, in 1982-83, to the highest unemployment rates in more than 30 years.

Thus the new wage policies found weakened worker resistance. 'Concession bargaining' made its first appearance. Swiftly, the new wage policies became set, and they quickly exerted great leverage on labor costs and productivity.

Here to Stay?

Does the new direction in wage setting have staying power? Will it lapse back to traditional pattern bargaining, or back off from giving top priority to production costs?

Predictably, in time, there will be serious challenges to the new wage setting thrust. Pattern bargaining, for example, gave unions a lot of clout. They could 'gang up' on major industries. Other settlements at other companies would fall in line like dominoes.

Nobody can answer the question on a possible union challenge. But, the recent concessionary attitude of labor on wage hikes suggests there will be little or no challenge. Major collective bargaining contracts settled in U.S. industry during 1985 hiked wages by an average 2.3 pct for the first year of contracts. The U.S. Labor Dept. said that was the smallest increase for any year since the department started keeping such records in 1968.

Recently, several labor consultants and economists predicted that 1986 will be the fifth straight year that U.S. workers will get receive smaller pay increases than the previous year.

The new U.S. wage policies are designed to help get production costs down and productivity up at individual companies. And that seems precisely what companies most need in the new world economy. That points to staying power for the new approaches to wage setting.

In fact, some economists say competition is worsening and that even now a worldwide "glut economy" exists. They see excess capacity for just about any manufactured product that can be named. Survival seems assured for only the low-cost producers in given industries.

In short, the new wage approach is key to successful corporate restructuring. At this point, it seems to be one element in all the restructuring with a clear-cut payoff. ☐

PRICE & PRODUCTION DATA

(Effective March 3, 1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	202	154	179	192
Pittsburgh	251	238	206	206
Youngstown	113	119	112	110
Lake Erie	163	162	130	159
Detroit	150	139	141	144
Chicago	521	505	509	442
Midwest	152	157	172	176
Southern	224	216	227	203
Western	92	92	87	95
U.S. Production	1,868	1,782	1,763	1,727

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower lake ports unless otherwise stated. [illegible] tion, handling and unloading may be charged to buyer. [illegible]

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8-13-85. **59.4¢—Pickands Mather [illegible] delivered hold of vessel, upper lake ports. ***72.5¢—U.S. Steel as of 8-15-85. 86.9¢—Oglebay Norton 3-25-82, Hanna Mining and Cleveland Cliffs 2-28-83.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective March 3, 1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,868	1,782	15,087	13,625
Capability Utilization Rate	74.9	71.4	70.5	61.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢ lb.—eff. 1-1-85)	24.607	24.607	24.607	27.582
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 73.50	$ 75.50	$ 75.50	$ 86.50
No. 2 bundles	$ 52.83	$ 53.83	$ 53.83	$ 57.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 73.50	$ 76.50	$ 76.50	$ 92.50
No. 1 steel, Philadelphia	72.50	72.50	72.50	81.50
No. 1 steel, Chicago	74.50	77.50	77.50	85.50
No. 1 bundles, Detroit	65.50	70.50	70.50	87.50
Low Phos., Youngstown	73.50	76.50	76.50	72.50
No. 1 mach'y cast., Pgh	73.50	68.50	68.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	92.50	98.50
No. 1 mach'y cast., Chi	109.50	109.50	109.50	111.50

*Finished Steel Composite: [illegible]

**Pig Iron Composite: [illegible]

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective March 3, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	51.69	50.44	3-3-86
Copper (C)	66.50-70.00	67.00-70.00	3-3-86
Lead	17.75-19.00	18.00-19.00	2-10-86
Magnesium Ingot	153.00	148.00	12-9-85
Nickel (LME)	187.42	182.18	3-3-86
Zinc	36.00	38.00	11-6-85

ALUMINUM: Avg. for last week & previous week. COPPER: [illegible] cathode. LEAD: common grade. MAGNESIUM: [illegible] NICKEL: Avg. for last week & previous week. ZINC: High grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.25-1.50
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$335.60
Indium, dollars per troy oz.	$2.50
Iridium, dollars per troy oz.	$430.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$240.00-260.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.00-3.13
Palladium, per troy oz.	$107.00
Platinum, per troy oz.	$390.00
Rhodium, per troy oz.	$1,085.00
Silver ingots, per troy oz.	$5.505
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, [illegible] Malaysian ringgit per kilo)

Feb. 24—375.59
Feb. 25—387.14
Feb. 26—392.12
Feb. 27—393.47
Feb. 28—383.36

Scrap Prices
Brass Mill Scrap

(Cents per lb. over 20,000 lbs. [illegible])

	Solids	Turnings
Copper	61	57
Yellow brass	51⅝	44½
Red brass	56	47½
Comm. bronze	57⅝	46¾
Mang. bronze	43	42
Free cutting rod ends	48	47

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	59
No. 2 copper wire	52
Light copper	43

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55	
No. 2 copper wire	48	
Light copper	39	
No. 1 composition	46	
No. 1 comp. turnings	45	
Hvy. yellow brass solids	30	
Hvy. yellow brass turnings	27	
Radiators	35	
Aluminum		
New mixed clips	38	— 39
Old sheet	36	— 37
Old cast	36	— 37
Clean dry borings	36	— 37

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	27	— 28
Mixed L.C. clips	23	— 25
Old sheets and cast	22	— 23
Borings and turnings	17	— 19
Duraluminum clippings	25	— 26

Copper and Brass

No. 1 copper wire	46	— 47
No. 2 copper wire	39	— 40
Light copper	32	— 33
Radiators	31	— 32
No. 1 composition	39	— 41
No. 1 composition turnings	36	— 37
Cocks and faucets	29	— 30
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 16
Old diecast zinc	11	— 12

EFFECTIVE MARCH 3, 1986

[illegible]

Ferrous Scrap Prices

Pittsburgh

[illegible]

Chicago

[illegible]

Philadelphia

[illegible]

Detroit

[illegible]

Youngstown

[illegible]

Cleveland

[illegible]

Buffalo

[illegible]

St. Louis

[illegible]

Birmingham

[illegible]

Cincinnati

[illegible]

New York

[illegible]

Boston

[illegible]

San Francisco

[illegible]

Los Angeles

[illegible]

Seattle

[illegible]

Hamilton, Ont.

[illegible]

Houston

[illegible]

OIL PRICE DROP ROUTES INFLATION CONCERNS

The year got off to a good start on the price front. Prices of producer finished goods in January declined by 0.7 pct from the previous month.

Much of the drop, of course, was due to slumping energy goods prices. These went down a resounding 4.2 pct. That's an annual rate of about 50 pct.

Energy goods aside, January was a month of mixed price moves. This is seen in prices for various types of capital goods. Overall, capital equipment prices dipped 0.1 pct in January. Pulling downward were prices of light trucks, chemical industry machinery, and pumps and compressors. Pushing upward were prices for heavy trucks, machine tools, office machinery and construction machinery.

The energy price break came at a time when price analysts were starting to take a hard look at some rippling inflationary pressures. As the Labor Dept. noted: "The (price) index had risen considerably in each month of the last quarter of 1985."

The energy price drop, however, has cooled any concerns about inflation sneaking back onto the scene.

Most oil analysts say the low prices on that commodity will be on the scene for some time. Too, it is expected that the effects of the oil price drop will spread to other industries.

Prices in metalworking industries, as indicated on the table here, continued to hold the line. For example, of the 22 metalworking product lines listed, 18 of them in January had either actual month-to-month price declines, didn't change at all or rose less than 0.5 pct.

The only product showing a "stiff" price hike in January was heavy trucks. These tags rose by almost 3 pct, and were up almost 11 pct over the year. Notably, heavy trucks face relatively little import competition.

Latest Month Covered: January 1986

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	396.9	+ 0.5	+ 1.7
Metal Forming Machine Tools	438.5	+ 0.3	+ 2.1
Agricultural Machinery & Equip.	338.6	+ 0.2	0
Construction Machinery & Equip.	365.0	+ 0.4	+ 0.8
Industrial Process Furnace & Ovens	395.2	+ 0.9	+ 3.4
Industrial Material Handling Equip.	295.5	— 0.2	+ 1.0
Pumps, Compressors & Allied Equip.	357.2	— 0.6	+ 1.0
Fluid Power Equip. (Dec. 1970 = 100)	265.7	0	+ 1.4
Mechanical Power Transmission Equip.	339.9	+ 0.3	+ 1.8
Automobiles	230.1	— 1.0	+ 1.3
Motor Trucks—Light	308.4	— 1.3	+ 4.9
Motor Trucks—Heavy	344.9	+ 2.9	+10.9
Railroad Equipment	364.5	0	+ 1.3
Fabricated Metal Structural Products	315.1	— 0.1	+ 0.5
Electric Motors	349.7	— 0.4	— 0.1
Valves & Fittings (Dec. 1982 = 100)	106.1	+ 0.8	+ 2.4
Ball & Roller Bearings	353.5	+ 0.1	+ 2.3
Cutting Tools & Accessories	288.6	+ 0.4	+ 1.4
Heating Equipment	264.6	+ 0.9	+ 3.2
Plumbing Fixtures & Brass Fittings	314.8	0	+ 2.7
Metal Containers	361.3	0	+ 1.1
Miscellaneous Metal Products	302.4	0	+ 0.2

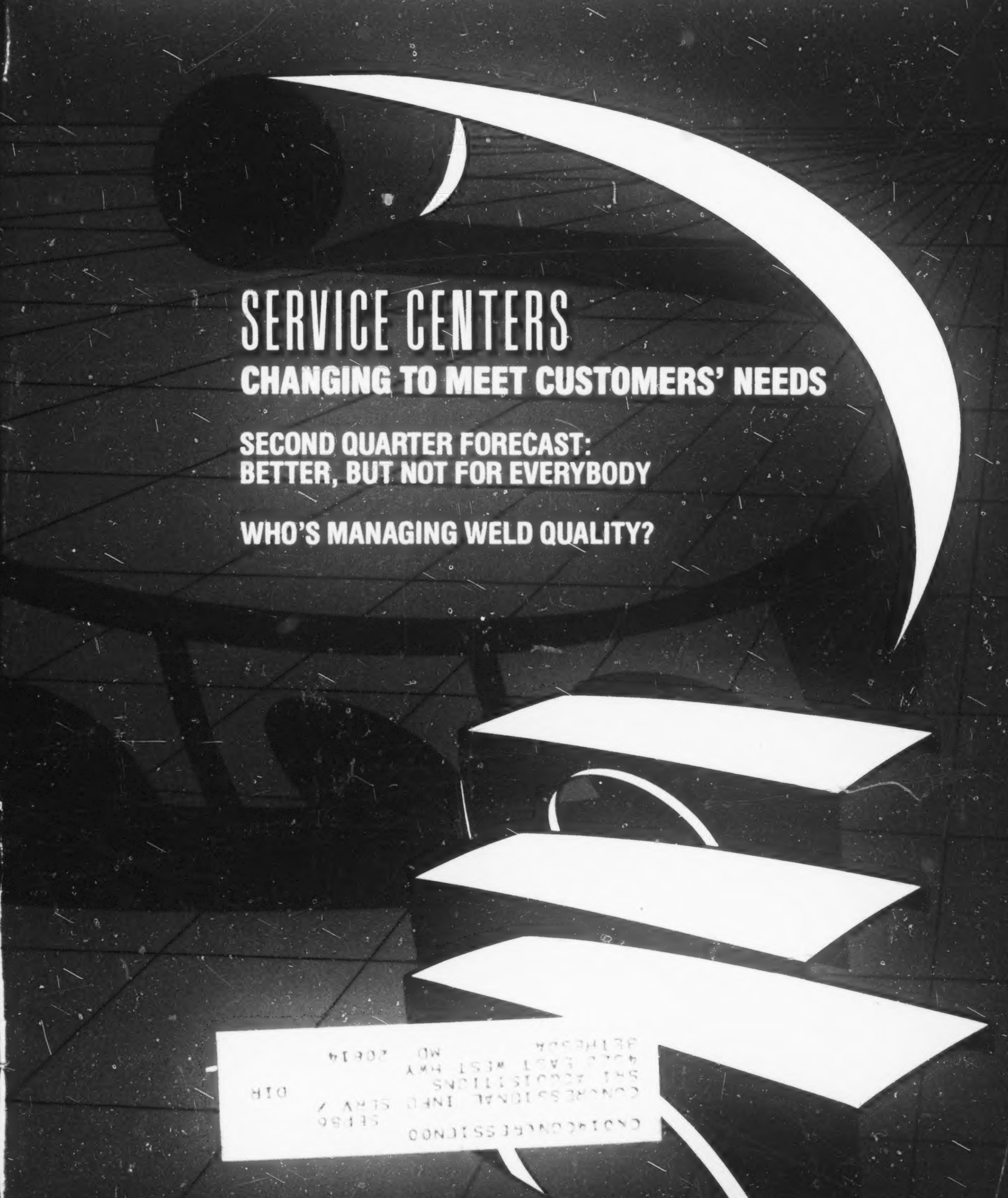
Data based on U.S. Labor Dept.'s Producer Price Index

C2150-8

IRON AGE

APRIL 4, 1986

MANUFACTURING MANAGEMENT



SERVICE CENTERS

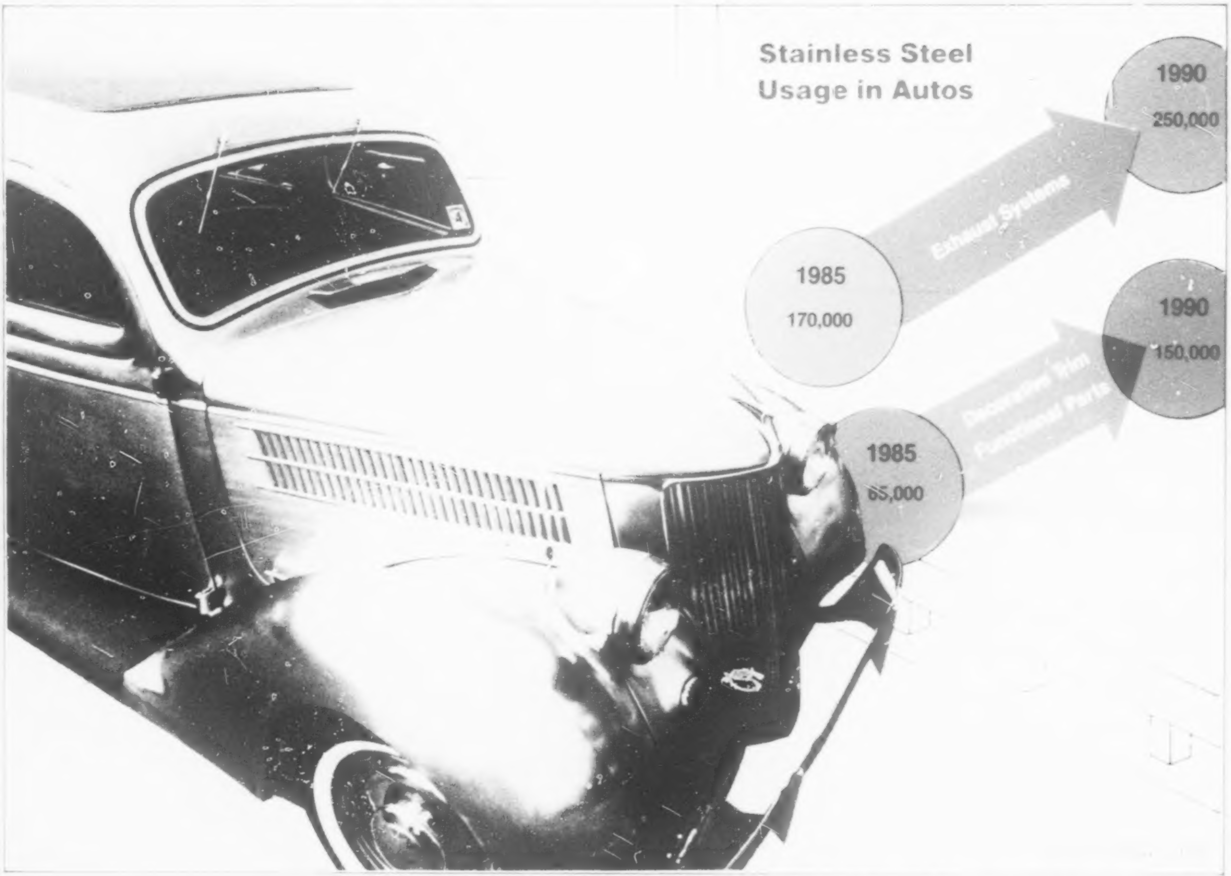
CHANGING TO MEET CUSTOMERS' NEEDS

SECOND QUARTER FORECAST: BETTER, BUT NOT FOR EVERYBODY

WHO'S MANAGING WELD QUALITY?

CNOI4CONGRESSIONO0 SEP86
CONGRESSIONAL INFO SERV / DIR
SRI ACQUISITIONS
4520 EAST WEST HWY
BETHESDA MD 20814

NEWSWATCH



Stainless and galvanized steel make gains on new cars

The luxury cars built at GM's Detroit/Hamtramck plant use more galvanized and stainless steel than any GM cars so far. Both electrogalvanized (EG) and stainless steel have made major gains on several other American 1986 and 1987 models, too.

Detroit/Hamtramck cars use precoated metals for 91 pct of their metal parts. All exterior parts except the roof use two-side galvanized steel. The cars use Armco's two-side hot-dip Ultrasmooth and will use EC steel as the new EG lines start up this year. GM will buy all its EG steel from four companies with long-term contracts for the material: LTV, Armco, Bethlehem, and Inland.

For the 1987 model year, GM plans to convert more panels to two-side EG steel. In the Chevrolet-Pontiac-Canada (C-P-C) group, two new models in the GM 25 and GM10 programs, which will start up in fall 1986 and fall 1987, respectively, will use two-side EG steel for all exterior panels except the roof.

All EG steel for GM exterior panels will have a pure-zinc coating of 70 grams/sq m on both sides. The one exception will be the quarter panels, which will have 70 g/sq m of pure zinc outside and 90 g/sq m inside.

The exhibit of the American Iron and Steel Institute (AISI) at this year's Society of Automotive Engineers (SAE) congress in Detroit displayed bodies in white of the Cadillac Eldorado, one of the four models built at Detroit/Hamtramck; the Honda Accord built in Marysville, Ohio; and the American Motors Jeep Commanche. Detroit/Hamtramck builds the Buick Riviera, Oldsmobile Toronado Brougham, and Cadillac Eldorado (the GM E cars) and the Cadillac Seville (GM's K car). The

Jeep Commanche uses 700 lbs of one- and two-sided galvanized steel.

Detroit/Hamtramck cars also are the only large-volume GM cars that use stainless steel exhaust systems. "GM has no definite plans to use more stainless steel exhaust systems in 1987 or 1988, but eventually we will," said Ronald S. Michalak, manager of manufacturing engineering of the Buick-Oldsmobile-Cadillac group, at the AISI press conference.

At a press conference the next day, however, Allegheny-Ludlum Steel Corp. executives predicted that U.S. vehicles will use 250,000 tons of stainless steel for exhaust systems and 150,000 tons for decorative trim and functional parts by 1990, if 15 million cars and trucks are sold then. In 1985 those figures were 170,000 tons and 65,000 tons, respectively. U.S. stainless steel producers ship about 1.2 million tons annually, so automakers could account for one-third of those shipments if that forecast proves true.

Today's Ford Taurus/Sable, Chevrolet Corvette, and Pontiac Fiero also have stainless exhaust systems, as do 95 pct of current light trucks. All of Chrysler's cars and trucks will have stainless steel exhaust systems by 1987. Chrysler and Ford also use some stainless steel fuel tanks; GM has no plans for them.

At the SAE show, Allegheny-Ludlum displayed two cars with stainless steel bodies—a 1936 Ford sedan (see photo, p.15) and 1967 Lincoln Continental convertible.

Steelworkers at LTV asked to approve new 40-month pact

Negotiators for the United Steelworkers of America and LTV Corp. reached a tentative agreement on a new 40-month contract that cuts wages and benefits by more than $3 per hour. The union's rank and file members are expected to vote by mail on the new pact.

The new agreement provides the the financially troubled steelmaker with an estimated 9 pct cut in the average hourly wages and eliminates cost-of-living adjustments. In return, the Steelworkers will receive a profit sharing plan that requires total repayment of all concessions at the end of each year, either in cash or a new series of preferred stock convertible into LTV common stock.

STEEL
TALKS

In addition, the Steelworkers obtained revisions on contracting out, overtime and grievance procedures.

The negotiators reportedly reached the accord by March 15, the target date the two sides had set for an agreement. The speed with which talks progressed reflected concern by the parties with the damage that could be done by a lingering strike threat. Contracts between the Steelworkers and many of the major domestic steel producers expire Aug. 1.

For the first time in 30 years, the steel companies will be bargaining separately. Also for the first time, new steel contracts will go to workers at the individual companies for ratification.

Contract talks between LTV and the union began in January. Both sides realized that a prolonged strike threat would invite a surge of steel imports. The large customers have supposedly given the mills until April 1 to either nail down a labor agreement or provide inventory protection against a steel strike. If neither of these is forthcoming, the customers say they will make foreign commitments.

Congressmen pressing Reagan for import limits on Japanese machine tools

Powerful members of Congress are pressing President Reagan to set tough import quotas for Japan to protect the import-battered machine tool industry, but administration sources say he's considering requesting softer voluntary restraints.

The proposed quotas surfaced three years ago when the National Machine Tool Builders Association requested import restraints, and since then foreign machine tools have captured 43 pct of the U.S. market, up from 26.4 pct. The value of Japanese machine tool imports tripled in the same period, jumping from $535 million to $1.5 billion last year.

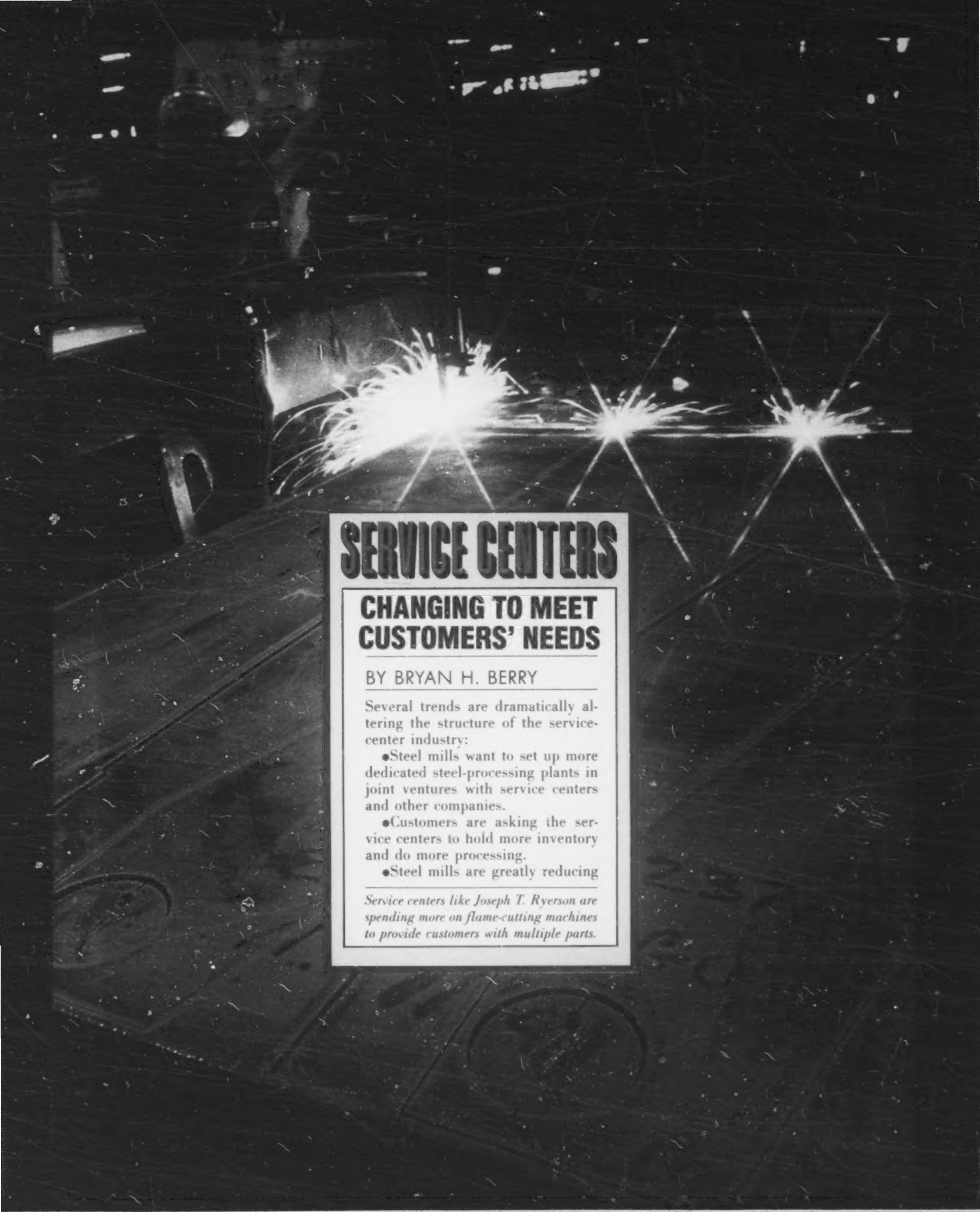
The industry recently gained allies in House Minority Leader Robert H. Michel (R-Ill.) and 26 other Republican House members, who argue that import quotas are needed for national security reasons since foreign manufacturers produce about three-fourths of the state-of-the-art, computer-contolled lathes and machinery centers needed to make weapons ranging from missiles to rifles.

In a letter to Mr. Reagan, they contended, "The very foundation of our national security and economic well-being depend on the skill and capacity of the machine tool industry. There is a serious threat to the national security posed by our growing dependence on imports for high-technology defense-sensitive machinery."

They have an ally in Commerce Secretary Malcolm Baldrige, who two years ago proposed that strict limits be put on machine tool imports for national security reasons. Mr. Baldrige called for banning 90 pct of all imports, which would have shut Japan out of the U.S. market.

However, sources say, advocates of free trade in the Administration kept that plan from going to the full Cabinet. Early this year Mr. Baldrige asked Donald T. Regan, White House chief of staff, to support the less ambitious program of requesting voluntary quotas from the Japanese.

(Cont. on p. 18.)



SERVICE CENTERS

CHANGING TO MEET CUSTOMERS' NEEDS

BY BRYAN H. BERRY

Several trends are dramatically altering the structure of the service-center industry:

- Steel mills want to set up more dedicated steel-processing plants in joint ventures with service centers and other companies.
- Customers are asking the service centers to hold more inventory and do more processing.
- Steel mills are greatly reducing

Service centers like Joseph T. Ryerson are spending more on flame-cutting machines to provide customers with multiple parts.

the price discounts they used to give service centers. No longer can service centers earn their living simply by selling discounted metals. Now the quality of the value they add to the metal is what will distinguish one service center from another.

"The margin for error in this business is thinner today than at any time I can remember," said Andrew G. Sharkey, president of the Cleveland-based Steel Service Center Institute (SSCI).

"There are too many people in this business," bluntly warned one service-center president. Several service-center executives told *Iron Age* they expect to see service centers contract or fold in today's heightened competition.

Metalworking industries are scrutinizing two key joint ventures that could point the way to a number of similar projects:

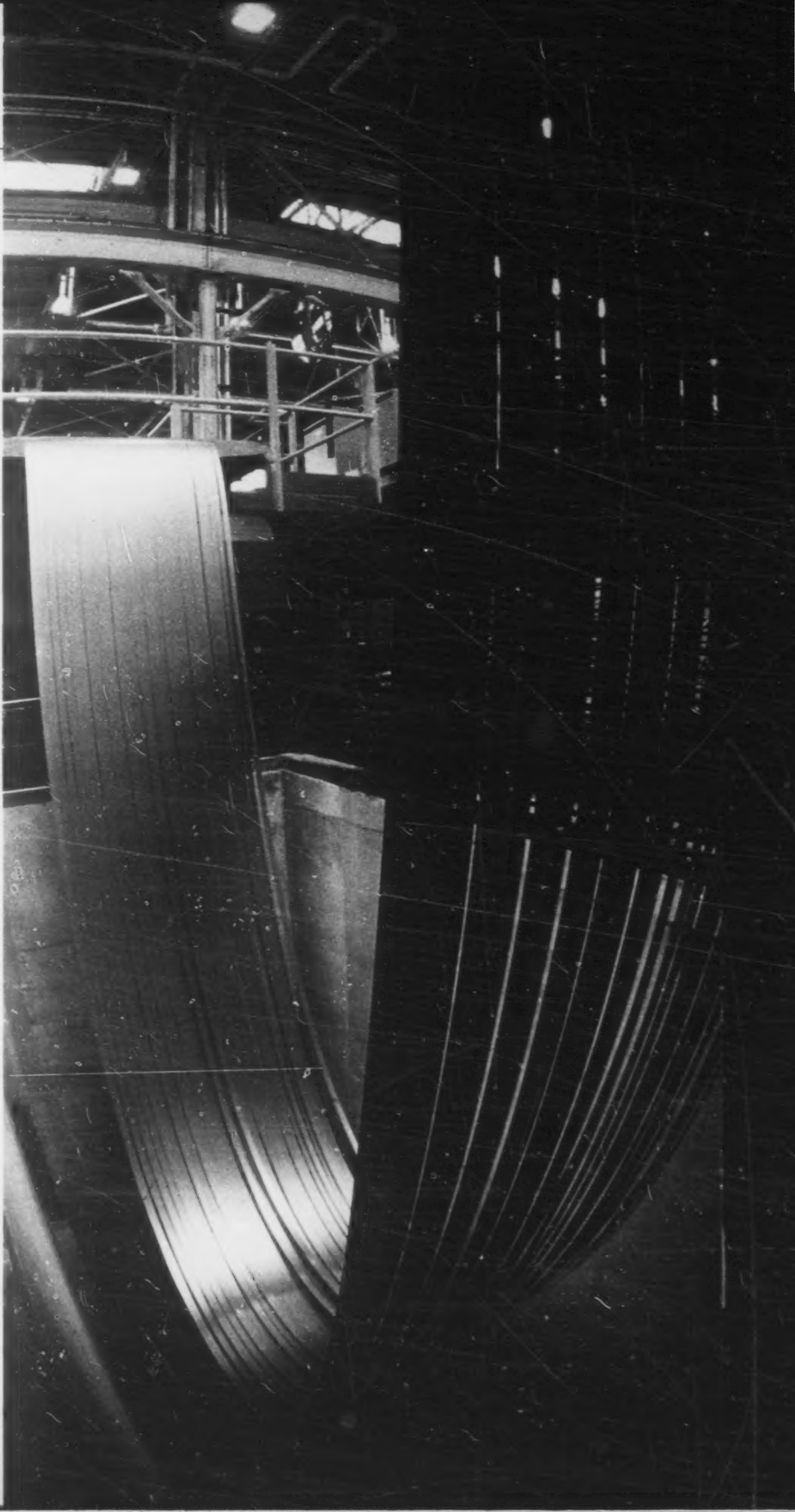
—United States Steel Corp. and Worthington Industries are jointly building a plant in Jackson, Mich., to slit coils and shear first-operation blanks for the auto, appliance, and other industries. The $12 million plant, which is scheduled to start up this August, has a capacity of 600,000 tons per year.

—Since last summer, Kasle Steel Corp. (Dearborn, Mich.) has been blanking steel for all the body panels used on the Buick LeSabre. Both the Kasle and Buick plants are in Flint, Mich.

It's too early to say how successful these two ventures will prove to be. But several other companies already are planning similar projects.

Armco and C. Itoh & Co. plan to build several jointly owned processing centers to handle mainly Armco steel. One plant in Tipp City, Ohio, will do slitting and blanking.

U.S. Steel could form similar joint ventures to build other processing plants in Chicago and elsewhere. Inland Steel and Joseph T. Ryerson & Son, Inc., Inland's service-center subsidiary, could jointly build a processing plant. National



Service centers are installing equipment to do more processing. This new slitter at Ryerson can slit 72-in. wide steel coil into widths as narrow as one in.

Ryerson/Tony Kelly

Steel and Weirton Steel are both looking at similar projects.

"Steel mills that can control processing will do better than steel mills that don't," commented W. Gordon Kay, president and CEO of J.M. Tull Industries. "Mills can coordinate production schedules, deliveries, and scrap handling better with processors they own. I expect all the steel mills to look at arrangements similar to the U.S. Steel/Worthington one."

"Service centers should consider joint ventures with steel mills to set up processing plants dedicated to one, two, or three mills and a large-volume end-user," said Sheldon Arnot, Bethlehem Steel executive vice president.

Many steel-mill and service-center executives see possibilities for ventures between the two industries.

One big reason is that service centers' average $12 labor cost is one-half that of the steel mills'.

Steel mills and service centers generally need to work together better than in the past, says Mr. Arnot. Service centers too often have been reluctant to share information about their customers with the mills. They've feared that the mills would steal their customers—an unfounded fear, say steel executives.

When service centers tell the mills how the steel will be used, said Mr. Arnot, the mills can tailor the steel's metallurgy to its application.

The simplest way for a steelmaker to know how his steel will be used is to sell directly to the end-user. And for large-volume customers like the auto, appliance, and farm-equipment industries, that's the direction steel mills are heading.

In some cases, that's the only way the mills can satisfy the increasing demand by customers that the same mill supply all the steel for each different part. General Motors has taken the lead in reducing the number of steel suppliers per car part.

By selling steel directly to the auto plant, the steel mill usurps the service center's traditional role as steel salesman. Instead, the mills are offering service centers the new role of dedicated processor.

When LTV's new electrogalvanizing (EG) line starts up this month, LTV will supply all the exterior body steel for the Buick LeSabre. LTV and Buick are contracting the blanking to Kasle, which will blank all the body panels but never own the steel. LTV retains ownership of the steel until it reaches Buick.

On the other hand, most metal goes not to large-volume users like automakers but instead to small-volume manufacturers. For these customers the steel mills are increasingly depending on the service centers to sell the steel.

From 1978 to 1985, the percentage of carbon steel shipped by American steel mills to service centers rose dramatically: from 21 to 30 pct (see table, p.32). Bethlehem's Mr. Arnot sees that figure approaching 50 pct over the next 20 years.

Automotive Blanking

Still unclear is whether arrangements like the LTV/Kasle/Buick venture increase overall manufacturing efficiencies. On the face of it, you'd think not: Wouldn't it be more efficient for Buick to stamp blanks in the same plant it final-stamps body panels?

Apparently not, if Buick's past blanking efficiencies are any guide. Kasle Steel claims it's reducing blanking rejects by 50-75 pct compared with Buick's performance. Plus, Kasle's labor costs are lower.

"Our job is to eliminate defects," said Kasle Steel President Leonard Kasle. "Every shipment we send to the manufacturer must be totally usable." The cost of Kasle Steel's contract, says Mr. Kasle, is more than offset by the reduced number of defective blanks.

Another reason for Kasle's service, says Mr. Kasle, is Buick's use of all electrogalvanized steel for the outer body panels. All the coated steel must be washed in a spotless environment. Kasle washes some of the Buick steel twice—before and after blanking—to remove all lint.

Also, proper handling of EG steel is more important than for uncoated steel. Uncoated steel that's scratched or burred can be metal-finished and re-used. Not so with galvanized steel.

Kasle's Flint Auto Blankers Division certainly is scrupulously clean. A machine-vision system scrutinizes the steel coil, which then is washed, dried, and oiled without solvents or brush rolls ever touching the steel. Cincinnati-Milacron robots lift the blanks with vacuum suction cups.

The $8 million facility also blanks steel from eight other steel mills for other customers, including Ford, Chrysler, and other GM plants. Buick eventually will account for about 55,000 tons of the plant's 100,000 ton capacity.

One top purchasing executive at Ford, however, pooh-poohs the arrangement. "I can't believe the prices GM is paying for blanking at Buick," he told *Iron Age*. "I'm hearing GM pays $75-115/ton more under the new arrangement than when Buick did the blanking."

To be sure, Buick's blanking equipment was antiquated. Faced with the options of paying money to Kasle or to a machine-tool builder, the automaker chose the former.

Buick itself would not comment on the new blanking set-up. "We want to take a good long look at how this works before we comment on it," said a Buick spokesman.

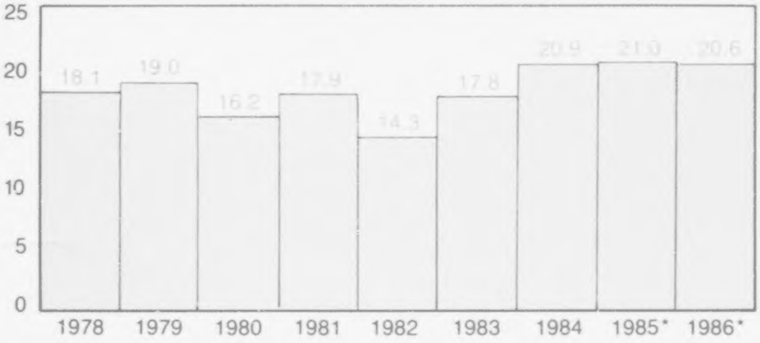
Ford does little purchasing from service centers, explained the Ford purchasing executive. Chrysler is more interested than Ford in contracting blanking to service centers, because Chrysler has used up all the floor space in its three stamping plants. Chrysler now faces a choice somewhat similar to Buick's: Should it invest $75-odd-million in a new stamping plant or pay smaller fees to service-center contractors?

General Motors, meanwhile, is considering contracting out blanking for at least three other plants: the Chevrolet-Pontiac-Canada (C-P-C) plants at Oshawa, Ont., and Parma, Ohio; and the Truck and Bus plant at Indianapolis. A dozen companies are bidding for the blanking order at Oshawa, which will involve 100,000 tons of steel for outer and inner panels. Budd Co.'s stamping plants also are considering contracting out blanking.

One likely competitor for the GM Parma and Indianapolis orders is

Service Center Steel Shipments May Drop Slightly in 1986

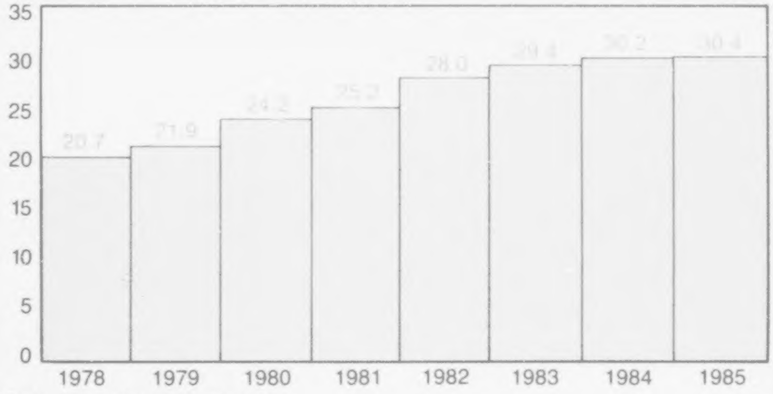
Industrial Steel Products Shipped by Service Centers (millions of tons)



Source: Steel Service Center Institute
* Iron Age estimates

Steel Mills Keep Shipping More Steel to Service Centers

Percentage of Carbon Steel Shipped by Domestic Steel Mills to Service Centers



Source: American Iron and Steel Institute

Marubeni America, the $12 billion subsidiary of Japan's $53 billion Marubeni Corp., a trading company. Marubeni Corp. is part of the huge Fuyo Group, a consortium of 29 Japanese companies that includes automaker Nissan and steelmaker Nippon Kokan. Marubeni is considering both building a plant devoted just to blanking and acquiring one to four more service centers in the Midwest.

Last year Marubeni bought Bleim Steel, a Toledo service center that serves mainly automakers in Michigan and Ohio. No doubt Marubeni would like to acquire service centers that can serve the Japanese automakers in the U.S.: Honda in Ohio, Nissan in Tennessee, and eventually Mazda in Michigan and Mitsubishi-Chrysler in Illinois.

Marubeni also is considering setting up computer links between a service center and steel mill and coordinating production at those two plants with that of a major end-user, probably in the auto industry. In Japan, steel mills supplying such major automakers as Toyota and Nissan synchronize their steelmaking schedules with the automakers'. The service centers storing steel for the automakers tend to be owned by steel and auto companies and banks.

One Marubeni executive estimates that it will be two or three years before American steel mills can synchronize their schedules for just-in-time deliveries to major end-users. "We think we can improve the quality of U.S. service centers with Japanese know-how," he said.

"Everybody's talking about just-in-time manufacturing now," commented Leonard Kasle, "and nobody's doing it. But end-users and steel mills see the value of having stable schedules and coordinating them. It takes time to change corporations' internal structure.

"In two or three years, everybody who will be staying in business will use just-in-time manufacturing."

Kasle Steel plans to handle and deliver all steel for Buick just-in-time by the end of this year. As of today, little is shipped that way.

Partnerships

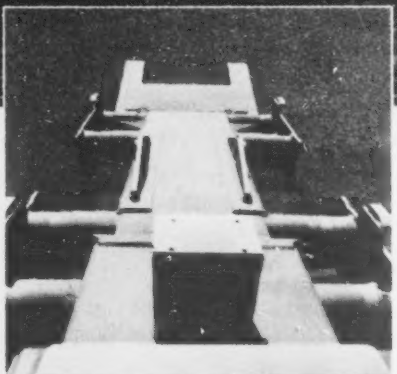
Though steel mills and service centers must work closer together to coordinate manufacturing, most observers foresee little direct vertical integration between the industries.

"I do not see vertical integration of service centers within the steel industry as a strong long-term trend," said SSCI President Sharkey. "Instead, I see a long-term trend toward more outsourcing by the steel mills, who want more flexibility.

"On the other hand, I think we'll see a tremendous acceleration of partnerships, joint ventures, and arrangements that don't involve direct ownership of one company by another. You'll see mills coming together with other mills, mills with service centers, service centers with customers, and customers with mills as companies try to meld the strengths of two or more parties to meet specific needs in the marketplace."

"I foresee more trading between the service centers, so the overall supply system will be more efficient," said Henry B. Peterson, president of U.S. Steel Supply Division, a subsidiary of U.S. Steel Corp. "Not everyone can afford to have the same pile of steel lying on his floor."

(Cont. on p. 35)


ALGOMA QT 700 (QT100), High Strength Quenched and Tempered steel forms the undercarriage of the Husky 8

Two major steel mills now are in the process of divesting themselves of their service-center units. National Intergroup wants to sell not only its half ownership of National Steel but also its 24 service centers. Marubeni would be an obvious candidate to buy at least some of National's service centers: Both Marubeni and Nippon Kokan, which owns the other half of National Steel, belong to the Fuyo Group.

Bethlehem Steel is selling J.M. Tull Industries, the network of 12 Southeastern service centers headquartered in Norcross, Ga. Bethlehem bought Tull for about $95 million in June 1985 and wanted to expand the service-center company. That plan was scotched when the steelmaker suffered much greater losses in the second half of 1985 than it had expected. Bethlehem lost $196 million in all of 1985.

Still, steel mills should consider owning service centers for several reasons, said Tull President Kay:

—Service-center profits are not large but are much more predictable than steel mills' cylical earnings;

—Service centers are not as capital-intensive as the mills, and

—Service centers, which distribute plastic, aluminum, stainless steel, and other materials, aren't as dependent on the fortunes of carbon steel.

Tull earned $6 million on sales of $195 million in 1984 and also made a profit in 1985.

The heads of at least three major service-center companies also have expressed an interest in owning a Southeastern plant. Ryerson has purchased property near Atlanta where it might begin building a plant this year.

U.S. Steel Supply Div. may shut down one Northern plant and open up one Southern facility. "Everybody has to look at the Southeast and Southwest," said Mr. Peterson. "That's where the growth is.

A.M. Castle & Co. (Franklin Park, Ill.) added a plant in Philadelphia in 1984 and in Charlotte, N.C., in 1985 and will add another one in Rochester, N.Y., this year. "We could add even more plants this year, or expand existing ones," said A.M. Castle Chairman Michael Simpson. "The only area where we have a significant void is the Southeast, which is an attractive market."

Kilsby-Roberts (Brea, Calif.) is actively looking for a new plant in Philadelphia, New York, or New Jersey this year. The company already has signed contracts to acquire plants in Cleveland and England this year.

O'Neal Steel (Birmingham, Ala.) last year bought Shelby Steel, which has one Kentucky and three Indiana plants. O'Neal could buy more plants this year. "We're always looking at acquisitions in areas contiguous to the facilities we have," said O'Neal President James Wall.

O'Neal is a partial owner of Tuscaloosa (Ala.) Steel, which recently began producing hot-rolled plate using a new technology developed by Tippins, Inc. (Pittsburgh). Other co-owners of Tuscaloosa are British Steel, which will supply 30-ton jumbo continuous-cast slabs; and American Cast Iron & Pipe Co. (Acipco, Birmingham), which will distribute pipe made from Tuscaloosa's steel. O'Neal will use the steel to make and sell plate and band.

O'Neal and Tuscaloosa will have the traditional arm's-length relationship that Ryerson and U.S. Steel Supply have with Inland and U.S. Steel. In all three instances, the two companies have a business relationship. But the service centers do not get involved in actual steelmaking and distribute many other products from other mills and to areas the partner mills don't serve.

Adding Value

The area of most growth for service centers is doing processing operations that the end-users used to do. Service centers already do some processing to 80 pct of the products they ship. That figure varies from company to company. Ryerson, for example, does some processing to 50 pct of its products, though that figure is rising.

Lack of floor space is another reason customers ask service centers to do more processing, particularly in the kind of flush times that the auto

(Cont on p. 39)

and other industries now are having. Service centers now are doing more slitting, blanking, shearing, burning, and cutting to length.

Some service centers, however, prefer not to spend money on the equipment for increased processing. "Our company isn't interested in setting up a blanking operation like Kasle's," said Mr. Peterson of U.S. Steel Supply. "That involves significant capital expenditures. Instead, we'll do more processing of plate: more burning, bending, rolling, first-stage welding."

Sales and Spending

The SSCI expects industrial steel shipments by service centers to drop slightly from the record 21 million tons in 1985 to 20.6 million tons this year (see table p.32). But sales in dollars should be up in 1986. That should raise this year's profits slightly above last year's.

Prices and inventory values fell 10-12 pct from the fourth quarter of 1984 to the fourth quarter of 1985. That's why sales volumes declined even as tonnages rose in 1985.

In 1986, however, the steel mills are raising prices by about 5 pct for structural and 9 pct for flat-rolled products—and reducing the discounts that used to favor service centers. That means that service centers no longer will be able to offer their customers the kinds of discounts they did in the past.

On the positive side, more stable mill prices mean that service-center inventory values should hold firm or increase slightly in 1986. But gone are the days when service centers could count on making money simply by stockpiling material and watching prices rise as time passed.

This year the steel mills may raise their prices faster than the service centers can raise their own selling prices, predicts SSCI President Sharkey. That will put more pressure on service centers to find new ways to add value to the metal.

To increase their flexibility to changes in customer demand, service centers are leasing rather then buying additional equipment. Most of the capital spending planned by service-center companies in 1986 will go for upgrading equipment, not expanding floor space.

As in past years, much of service centers' spending will go for computer information systems. More service centers are setting up computer links so their customers will have real-time access to their stocks.

Another trend is the increased use of sophisticated instruments and controls to ensure closer tolerances than in the past. Service centers also are making incremental improvements in material handling.

In 1985 Ryerson spent $25 million on capital equipment, including: (1) numerically controlled equipment that cuts delivery time by as much as one month, (2) a plasma/punch machine that can cut, punch, drill, tap, and scribe in one CNC set up (see photo, p. 29); and (3) high-speed slitting equipment to produce tighter steel coils with closer tolerances and better finishes.

Ryerson President Foster expects his company's sales to be up at least 3 pct from 1985's $1.06 billion—almost a third of Inland Steel's revenues. Ryerson has budgeted more money for capital spending this year, too, though part of that could be used for the new plant in Atlanta.

A.M. Castle shipped 230,000 tons of metal in 1985 but had a return on sales that was less than the industry average of 2 pct. The company will continue its strategy of moving from "mass" to "class" markets. In mass markets, said A.M. Castle Chairman Simpson, the lowest price wins the order 90 pct of the time. In class markets, quality and performance distinguish one service center from another.

The sales and capital spending of Earle M. Jorgensen Co., says company President John W. Jorgensen, will be about the same in 1986 as in 1985. The company's aerospace customers are doing well, but the oil-tool industry remains depressed.

Likewise, Precision Steel Warehouse (Franklin Park, Ill.) will have about the same sales and capital spending in 1986 as in 1985, said company President David G. Hillstrom. This month it will install a $125,000 Reusch oscillating coil-winding and welding machine.

William Gimbel of Reliance Steel & Aluminum expects his company's sales to rise by 10 pct from 1985 to 1986 while tonnage rises 3-4 pct. The California-based company, which handles 25 pct aluminum and 75 pct steel, plans $5 million in capital spending this year, down from $7 million last year.

Metal Goods President John Horstmeyer expects his company's sales to be higher in 1986 than 1985. The company's leading products are stainless steel.

Kilsby-Roberts will increase sales by 7 pct from 1985 to 1986, company President Neven Hulsey told *Iron Age*. "Half that increase will be due to rising shipments, the other half to firming prices," he said.

Much of Kilsby-Roberts' capital spending this year will go to upgrade its new Cleveland plant. Almost all Kilsby-Roberts' products now are tubing. The Cleveland plant, which handles bar, could lead the company into other products, said Mr. Hulsey.

Ziv Steel Co., based in Livonia, Mich., is one of the leading distributors of high-alloy tool steel. The company had sales of $14 million in 1985 and expects the same in 1986.

Like other service centers, Ziv Steel is trying to refine its customer base and not sell all steels to all customers. The company plans to begin requiring minimum orders of $50, which will motivate customers to consolidate small orders. "Service centers must concentrate much more on marketing and merchandising than in the past," company president Alvin R. Ziv told *Iron Age*.

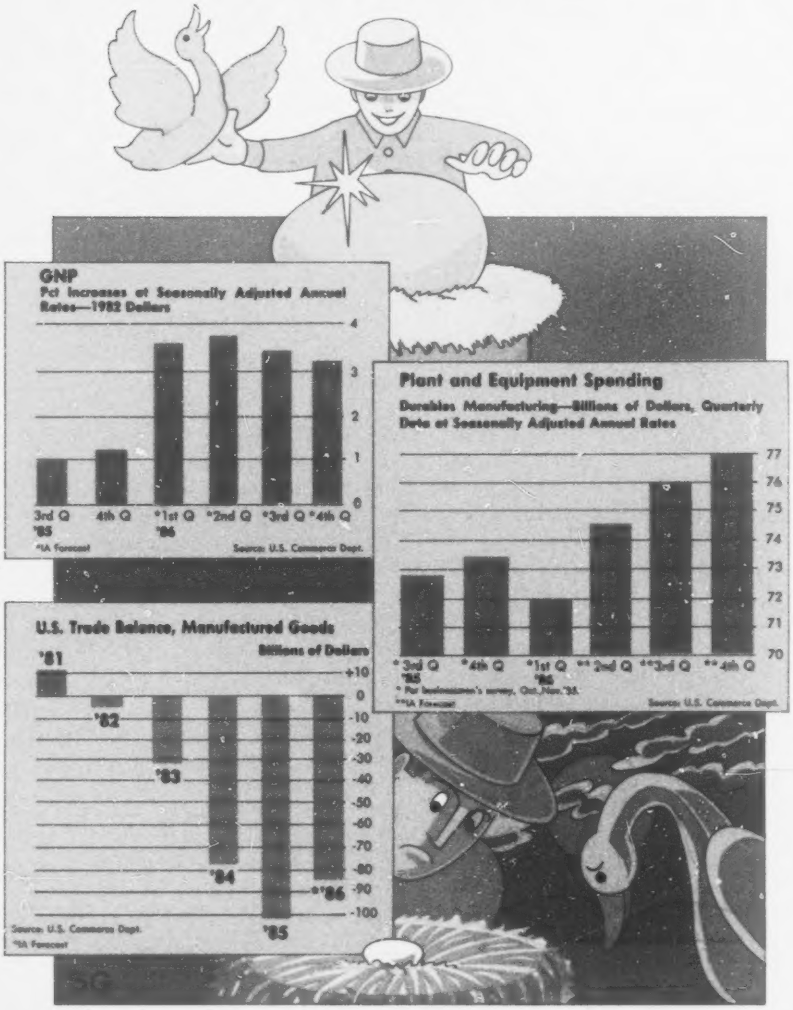
As service centers avoided carrying costly stock last year, the depot stocks of both foreign and domestic mills grew steadily. In some cases small service centers found the stocks to be quick, convenient sources of steel.

But SSCI President Sharkey warns strongly against the trend. "The service centers are the sourcing, inventory, processing, information, and distribution experts," said Mr. Sharkey. "We'd better be careful not to abdicate our functions in response to any short-term market pressures." ☐

SECOND QUARTER REPORT:

BETTER. . . BUT NOT FOR EVERYBODY

The golden eggs of economic growth this year will not be shared by all



GNP

Pct Increases at Seasonally Adjusted Annual Rates—1982 Dollars

*IA Forecast

Source: U.S. Commerce Dept.

Plant and Equipment Spending

Durables Manufacturing—Billions of Dollars, Quarterly Data at Seasonally Adjusted Annual Rates

* Per businessmen's survey, Oct.-Nov.'85.

**IA Forecast

Source: U.S. Commerce Dept.

U.S. Trade Balance, Manufactured Goods

Billions of Dollars

Source: U.S. Commerce Dept.

*IA Forecast

BY JOHN D. BAXTER

As far as the overall economy goes, growth this year will be stronger than last year. In 1985, the U.S. economy grew by 2.3 pct. This year, growth of about 3.5 pct looks like a good bet.

That's not boom growth by any means. But considering that the current business expansion is now 41 months old, that is still vigorous growth. This recovery is now the second longest ever achieved in post-World War II peacetime history. It should be running tired now, but it seems to be picking up steam.

Still, not all sectors of the economy are going to be swept along by the recovery tide. At least, not to the same extent as the overall economy. For one, continuing huge imports will bend down the growth curve for a number of basic goods manufacturing industries. Included among those industries, will be many producers of capital goods.

First, a look at the bright side—why the economy as a whole will be strong this year.

For a starter, interest rates have been cooling. Over the past 18 months they have declined by almost 4 percentage points. At the same time, there is plenty of money available for corporate borrowers. Money supply growth last year of more than 12 pct was the fastest for any year in postwar history.

But all the big money supply and all the big borrowing hasn't pushed up general price levels. Inflation remains in the 3 pct to 4 pct range.

Then, on top of all the softness in interest rates and general price levels, oil prices have tumbled lately. At the time of this writing, oil prices have dropped from $25 a barrel in late 1985 to under $12. Some oil analysts look for single-digit prices on oil before a bottom is hit.

One economist has estimated that lower oil prices have released $50 billion of buying power for other goods and for personal savings.

More Good News

Add another spark lighting the economic fireworks in 1986: The dollar's trade-weighted value has plunged by 27 pct since February of last year. So far, as will be seen, the dollar decline has not yet stemmed the tide of imports. But it should help, possibly starting in the closing quarter of the year. At any rate, dollar-cooling has already become a confidence-builder in the economy.

Too, the economy will get a big push from inventory building this year. In 1985, inventories grew by only $9 billion following a $67 billion buildup the previous year. This marked the sharpest slowing of stock buildup for any 12-month period since the end of World War II.

The slack situation in inventories points to a strong 'catch-up' this year. The consensus of a number of economists calls for a $20 billion additions to business inventories this year. In other words, the economy in 1986 will get an $11 billion bigger boost from inventory building than it got last year.

Any outlook made about the economy, of course, has to include Mr. Big—the consumer. After all, he or she wields two-thirds of all buying power in the economy and is the end-product customer for most of the goods produced by industry.

Well, the consumer's passion to spend has cooled a bit lately, according to recent surveys taken by the University of Michigan and The Conference Board. However, a Conference Board analyst noted, "The comforting economic fact is that consumer confidence continues to hold at relatively high levels despite the less-than-inspiring performance by the overall economy."

That "less-than-inspiring performance" refers chiefly to U.S. economic growth of 2.3 pct last year following a super-hot 6.6 pct growth pace the year before.

It seems reasonable to expect that the consumer will make a comeback in attitude and spending inclinations as the 1986 economy moves at a quicker pace than last year.

With all those 'pluses' helping, it is hard to see anything but more recovery—and a stronger pace of recovery—this year. As noted, the current expansion is an old-timer. At 41 months in duration, it has been surpassed in peacetime years only by the 58-month expansion from March 1975 to January 1980.

Dark Clouds

In the garden party setting for 1986, there are unwanted guests. And those guests—huge imports and a plant spending lag—threaten to spoil the recovery party for U.S. capital goods producers and other basic goods manufacturers.

The real menace remains imports. As the chart here shows, during 1985 U.S. imports of manufactured goods exceeded exports by more than $100 billion. Spurred on by a strong dollar, the recent years' trend in this trade deficit has been from bad to worse.

The dollar has weakened. As of this month, it is down in exchange value by almost 27 pct. And the cooling of the dollar has been going on since February of last year. Still, most economists say it will take up to 18 months of a cooling dollar before any good signs show up in U.S. trade figures. So, this year could be another bumpy one for those industries up against heavy foreign competition, mostly producers of basic industrial goods.

A second thump will likely be felt in basic goods lines this year. A number of economists and business executives have projected either a slowed pace, or actual cutbacks, in spending for new plant and equipment this year.

The U.S. Commerce Dept., in its quarterly survey of business executives in the October-November period, found that capital spending this year would be a wash. In real terms, no change from last year was noted. Also, at least two large-scale private surveys show actual trimming of business capital spending, down from 2 pct to 6 pct from last year.

Not only will U.S. industry this year be spending less for new plant and equipment, but much of that spending will go for capital goods from overseas producers.

That's a double dose of bad news for U.S. basic goods manufacturers. Home-produced capital equipment is at the heart of their business.

There is still a third hard-to-swallow dose: Domestic suppliers to U.S. capital goods producers will see their orders slow, or even fall, as less capital equipment is made here. Each imported capital goods item is made of materials, parts and components that won't be made here.

Those are the reasons why a slowing in domestic plant investment can be so devastating to U.S. basic goods manufacturers.

In turn, those are also the reasons why U.S. basic goods manufacturers will not likely fully share in the expected faster economic growth this year.

There is another force shaping prospects for manufacturing industries this year. Call it de-industrialization, or whatever, but manufacturing industries in this country are caught up in a maelstrom of change. Manufacturers are turning to make-or-buy decisions in a big way—and often electing to buy rather than make products.

And those decisions frequently mean buying from overseas suppliers. Many manufacturers, instead of just sourcing parts from overseas, are subcontracting entire operations to foreign suppliers, or in many cases, giving up the making of end products altogether in favor of simply importing them.

Some have carried these moves to such an extent that they are now closer to being distributors than manufacturers. U.S. manufacturers themselves are becoming major importers to this country.

Many manufacturers, instead of buying new equipment to make new products, acquire companies already making such products. Others are electing to buy back big chunks of their own outstanding stock with corporate funds rather than new equipment.

As far as business forecasting goes, it is not clear how this great new ferment in manufacturing is affecting the economy. Clearly, though, it is a sweeping trend to be watched with care—not by just economists, but by executives at individual companies.

STEEL

There are promising signs, but no one is going overboard on the idea of a decisive steel surge.

The steel industry may be moving out of the pit it has occupied for the past four years.

The better outlook stems from a significant change in the international trade situation. Currency changes, import restraints and protectionist sentiment are making for more favorable trade trends.

Both direct imports of steel and indirect imports of autos, machinery and other products made of steel should be affected.

Hard evidence of a steel upturn is still skimpy. Steel shipments in the first quarter of 1986 will be up about 500,000 tons from both the first and fourth quarters of 1985. Further gains are indicated for the second quarter.

Even more significant, the steel price increases proposed for January are being supported, at least partly. Domestic and foreign prices are up.

There are promising signs, but no one is going overboard on the idea of a decisive steel surge. There are fears that the threat of a steel strike Aug. 1 is pumping artificial and temporary strength into the market. Most officials are still saying steel shipments will be down a little from the 72.7 million tons of 1985.

People are cautious, but there could be a dramatic change underway. What has killed steel and all manufacturing in the last four years has been rising import volume.

Steel imports zoomed up from 15.5 million tons in 1980 to 26 million tons in 1984. Also up were imports of manufactured products. These represented 13 million tons of steel in 1984 and probably even more in 1985. The direct and indirect steel imports have been running close to 40 million tons a year.

Direct steel imports seem to be easing. The 24.3 million tons imported in 1985 was down about 2 million from 1984. The 1985 total reflected heavy imports at the start of the year. In the last four months reported, imports were down to an annual rate of about 20 million tons.

The voluntary restraints are starting to have an effect. The most important effect may be to reduce the incentive of foreign producers to cut prices. This would be great news to domestic producers who say price problems stem from imports.

Apart from quantity limits, foreign producers may be influenced in their pricing by the effect of currency changes on their delivered costs. From March 1985 to late February 1986, the Japanese yen went from 258 to the dollar to 180.

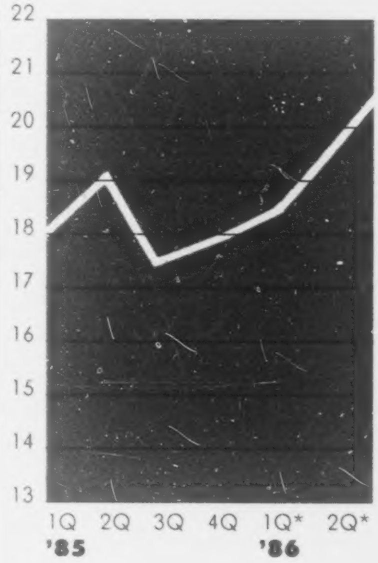
That meant that a Japanese hot band which sold for $250 a ton last March should now sell for $350 a ton. With the yen at 190, said one official, the delivered cost of Japanese steel is $15 a ton higher than the delivered cost of domestic steel.

The impact on manufactured products is similar. A Japanese car that sold for $10,000 in March 1985 should now sell for $14,000. The Japanese can elect to absorb all or part of the added cost, but the currency swing has some effect.

If economics have anything at all to do with international trade, the position of American industry should be improving. For American steel companies, the complicating factor right now is the strike threat. The mills are hoping to eliminate this threat by negotiating new labor agreements by April 1.

If there isn't an early agreement, there will probably be some hedging against a strike. Some of the hedging will be done by the mills, themselves. Two of the big auto companies have reportedly told steel companies to have 60-days extra supply on hand by Aug. 1. The other hedge would be in the form of commitments to buy foreign steel.

Steel Shipments
In Millions of Tons



Source: AISI
*IA estimate

NONFERROUS

Aluminum, copper and nickel producers look for an uptrend in consumption because of the crude oil price slide.

There were a few more pluses working for the nonferrous metals companies in the first quarter than were a year earlier.

One was the weaker U.S. dollar, which was taking the edge off import competition. Another was the generally low level of inventories at the producer level (except for lead) and low consumer stocks as well.

Consumption continues to run at a fairly good clip and, if it holds up, the producers should be in a position to cash in as the second quarter progresses. Price improvement in aluminum and copper was a bit thin in the initial period, however, in part because the unsettled tin situation continued to hang over hedge market values for both metals.

Major U.S. aluminum and copper producers must renegotiate wage contracts this spring and this has prompted some consumers to reconsider their lean inventory policies.

There was a surge in the order rate for aluminum items early in the first quarter, especially for aluminum ingot, but also for can stock and other flat rolled products. The aluminum industry's bookings usually are strong at the start of the year, but this year's kick-off was unusually strong. The Aluminum Association estimated January orders at 2.25 billion lbs, which was 53 pct better than January 1985.

The industry's price structure was showing signs of firming in the first quarter. The market for can stock promises to be a hotly contested one this year, however, with more capacity coming onstream and moving through qualification runs. U.S. aluminum industry forecasts for can stock shipments, meanwhile, range from a modest gain to a modest decline. That would be the first in this market since 1975.

Aluminum, copper and nickel producers generally look for an uptrend in consumption as the economies of industrialized and developing countries start realizing the benefits of the price slide for crude oil. Inco, Ltd., recently estimated that the cost of nickel production comes down between 2 and 4¢ a lb for each $1 a barrel drop in the price of crude oil. This could tend to encourage more nickel production, but the effect of lower oil prices on consuming industries should more than offset it, Inco said.

Nickel prices on the London Metal Exchange going into March were about where they were at the start of the year, but were up smartly from February lows.

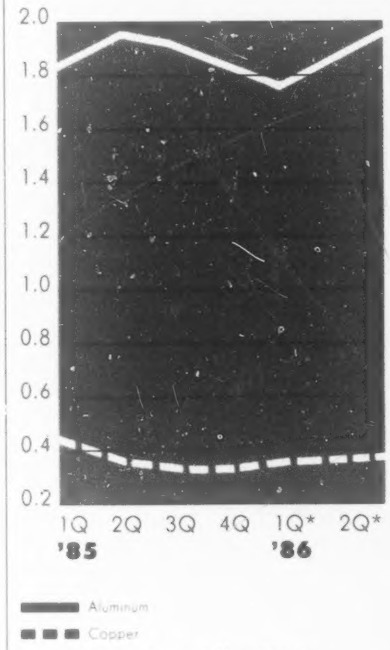
Copper deliveries by U.S. refineries also got off to a good start in 1986. There also were sharp drops in hedge market inventories as the first quarter progressed. Producer and hedge market inventories at the start of the year were well below levels at the start of 1983, the last copper wage renegotiation year.

Zinc demand remained firm in the first quarter and the U.S. producers continued to whittle away at their scarcely burdensome inventory. Automotive demand was firm for both die casting and galvanizing grades.

Primary producers of some base metals are feeling increased pressure from local secondary suppliers. According to the National Association of Recycling Industries (NARI), scrap claimed larger shares of the domestic market for aluminum, copper and stainless steel last year.

Despite heavy export volume, scrap aluminum's share jumped to 35.6 pct last year from 32.9 pct in 1984. For copper and copper-base alloys, the increase was from 44.1 pct to 45.2 pct. Stainless steel scrap was up more than three points to 46.7 pct (applying its own pressure to the price of primary nickel).

Nonferrous Metals Shipments
In Millions of Short Tons

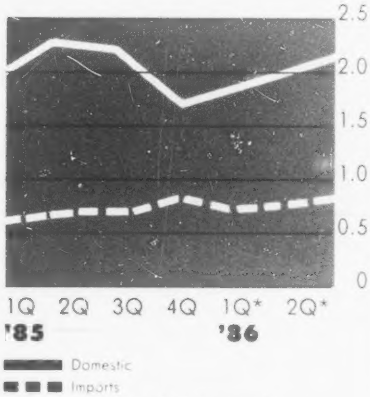


Source: American Bureau of Metal Statistics
Aluminum Assn
*IA estimate

AUTOMOTIVE; HEAVY EQUIPMENT

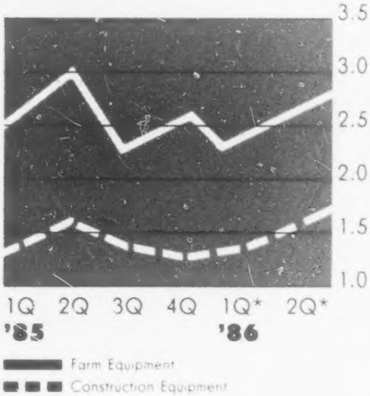
Domestic automakers plan to build 2.1 million cars in the second quarter this year.

Automotive Sales
In Millions of Units



Source: Motor Vehicle Manufacturers Assn.
*IA estimate

Heavy Equipment Shipment
In Billions of Dollars



Source: U.S. Dept. of Commerce
*IA estimate

AUTOMOTIVE—Domestic automakers likely will ship 2.1 million cars in the second quarter. That's 200,000 fewer units than in the second quarter of 1985 but 200,000 more units than in the first quarter of 1986. Shipments of imported cars likely will rise from 700,000 units in the second quarter of 1985 to 800,000 units in the same period this year.

Domestic automakers plan to build 2.1 million cars in the second quarter this year. Sales analysts expect dealers to have about a 78-day supply of domestic cars as the second quarter begins and an 83-day supply as it ends. A 65-day supply is considered ideal.

Sales of domestic cars began a slow decline in the second half of 1985 and will probably hit bottom in the second half of 1986 or early 1987. "This is just a moderate downturn in car sales," explained the sales analyst for one Big 3 automaker. "I expect sales to pick up again in 1987."

As sales have slowed, automakers have been offering a variety of incentives. GM, Ford, Chrysler, and American Motors all have been offering either discount financing or rebates on many of their cars.

The discounts are heaviest for the smallest cars, which the automakers are having the most trouble selling. As the price of crude oil has dropped, gasoline prices at the pump continue to drop. The least expensive brands of unleaded gasoline now are selling at $1-1.10/gallon in most parts of the country.

The Japanese automakers, meanwhile, will ship the same number of vehicles to the U.S. from April 1, 1986 to March 31, 1987, as they did during the same period in 1985-1986. They'll ship 2.3 million vehicles plus an additional 100,000 four-wheel-drive and other vehicles.

HEAVY EQUIPMENT—Shipments of farm equipment likely will drop from $3 billion in the second quarter of 1985 to $2.8 billion in the same period this year. Shipments of construction equipment, however, will rise $1.6 billion to $1.7 billion in the same period.

This is the year when the U.S. Congress' 1985 farm bill takes effect. The bill puts more pressure on farmers to leave land idle—and so cut the supply and, in theory, raise the demand for crops.

Farmers in 1986 will set aside 50 million acres for non-cultivation, compared with 35 million acres last year, one observer says. Fewer acres of active soil can't help but decrease demand for farm equipment.

World commodity prices remain low. Farmers' debts—and the cost of servicing them—remain high. As farmers receive more money from the government for not tilling land, however, the average income in 1986 should equal that in 1985.

Inventories of farm equipment are too high and need to be reduced. Equipment with over 100 horsepower has been hit the hardest. Shipments of farm equipment over 100 hp will decline by 7 pct; equipment of 40-100 hp, increase by 1 pct; and under 40 hp, rise by 7 pct.

Fully two-thirds of the variations in construction equipment is due to housing starts, says one economist. He predicts at least 1.7 million starts in 1986, after 1.74 million in 1985 and 1.75 million in 1984. Low interest rates could propel this year's starts above last year's level.

New housing means new roads. One economist forecasts at least $11.5 billion in government spending on highways and streets, compared with $11.7 billion last year. He expects almost 30,000 back hoes to be shipped in 1986—about the same number as in 1985.

MACHINE TOOLS; FLUID POWER

MACHINE TOOLS—The U.S. machine tool industry may be off pace by 10 pct in the next quarter, with no signs of relief.

The larger builders who are heavily involved in the development of machining and manufacturing systems appear to be doing well. Several large orders have been announced since the beginning of the year that reinforce the economists' predictions that flexible systems would be a strong area for this sector of the industry.

But every builder does not, at present, design and engineer complex systems. Most in this group produce standard machine tools such as surface grinders, cylindrical grinders, milling machines, metal forming and stamping presses, and a host of other machines which may stand alone or may be incorporated into larger systems by other firms. Generally speaking, these builders are in a holding pattern, with some making a little progress while others languish. The prospects for this group in the months ahead are for more of the same.

There is also a small group of builders who have carved out a niche over the years that continues to do well in spite of the ups and downs of the general business cycle. Some of these firms have built up an overseas business that is often countercyclical to the U.S.

A fourth segment of the machine tool market, the importers of standard as well as highly sophisticated machine tools, has grown in size over the past few years. Some of these firms have established manufacturing/assembly operations in the U.S. and are beginning to challenge the domestic systems builders. The outlook for this group continues strong due to lower prices, innovative spirit, and a strong economy that favors modernization programs.

FLUID POWER—New orders for hydraulic and pneumatic fluid power equipment during January showed a positive gain of 24 pct over December, yet were down 2 pct from a year ago. It seemed as though all of 1985 was a down year despite the upturn in the general economy.

The outlook for 1986 appears to be a duplicate of 1985, at least in the beginning. The recent decline in the value of the dollar and interest rates could have a two-fold beneficial effect. As the dollar declines, the cost of imports rises. This, of course, should discourage imports while improving the opportunities for domestic outsourcing.

Lower interest rates should entice domestic manufacturers to borrow capital for plant and equipment modernization programs at home rather than overseas.

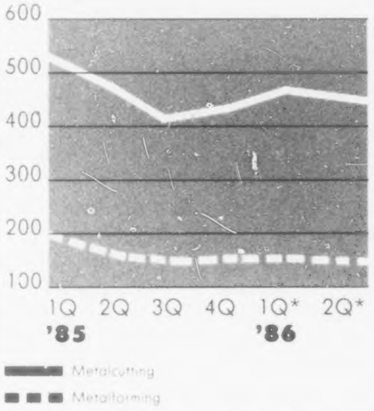
Further enhancing the outlook for fluid power in the months ahead is the outlook for its bellweather industries: aircraft, appliances, automotive, construction, defense, farm equipment, machine tools, and marine equipment.

The major or leading user of fluid power equipment is the mobile equipment sector, with 45 pct of the market. But factory automation also ranks high and there is a lot of activity in automated part transfer and part storage systems that is critical to this market, particularly with the trend to flexible, unmanned automated cells and systems.

Competition from overseas firms continues to plague the domestic fluid power industry. Direct competition is in the form of fluid power products, while the indirect comes from completed finished products that never saw the inside of a U.S. factory. Market share statistics are now beginning to be developed by the various associations but will not be available for many months.

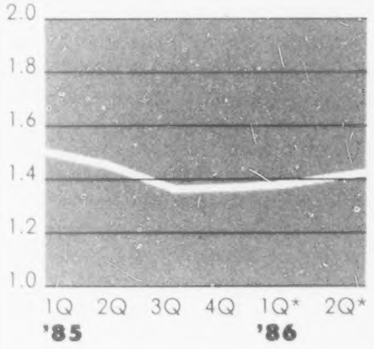
The U.S. machine tool industry may be off pace by 10 pct in the next quarter.

Machine Tools
Net New Orders
In Millions of Dollars



Source: National Machine Tool Builders Assn.
*IA estimate

Fluid Power, Sales
In Billions of Dollars



Source: U.S. Department of Commerce and NFPA
*IA estimate

COATINGS; PLASTICS

COATINGS—Shipments of industrial coatings likely will rise slightly from 99 million gallons in the second quarter of 1985 to 101 million gallons in the same period this year.

Metal office furniture and aluminum extrusions will be the markets of biggest growth for coatings.

The auto industry, the leading market for coatings, expects to build about 200,000 fewer cars in the second quarter of 1986 than in 1985.

Coil coatings continue to gain an increasing share of the coatings market in the appliance industry. "Just about every time an appliance maker changes his coating facility, he switches to coil," explained the coil-coatings manager of one major firm.

General Electric refrigerators, for example, use precoated coil for such interior parts as the shelving and also for such exterior parts as the cases. Ironically, precoated steel's smooth appearance works against its use for refrigerator doors: Appliance makers like the porcelain look of sprayed metal. Coil coaters, however, are working on embossing their material to win that sizable market, too.

Powder coatings are the fastest-growing segment of the coatings industry. Shipments of powder coatings jumped by 25 pct in 1985 and probably will do the same in 1986. Powder coatings now account for perhaps 7 pct of the coatings shipments, estimates one executive.

More auto and appliance plants are using powder coatings. The powder that doesn't land on the product being coated can be used again. And powders use no solvents.

"We could see all solvents eliminated from all coatings over time," said one executive. As government identifies a growing number of toxic elements in solvents, businesses are turning to powder coatings, water-based coatings, and coil coatings.

PLASTICS—One of the busiest activities in the raw materials business in the opening months of 1986 was trying to guess the effect of sliding oil prices on plastics (from resin through manufacturing) and the impact on rival materials. More than one source said there was little doubt that resin costs were coming down, but the full effect can't be predicted until the oil price settles, and with it the cost of natural gas.

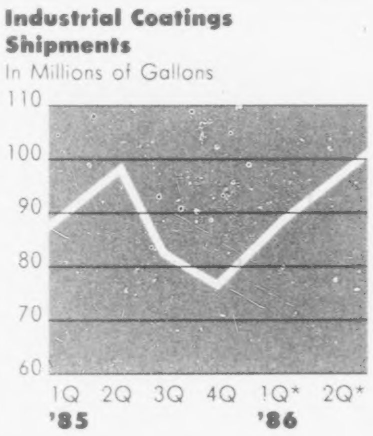
There was early speculation that the producers would switch to heavier feedstocks and this would mean more propylene and butadiene by-product.

Sources noted that most U.S. ethylene plants are geared to run more efficiently on the lighter feedstocks and this would limit any switch to heavier feedstocks right away. The problem, they said, will come when the European plants, which favor the heavier feeds, start applying the pressure here.

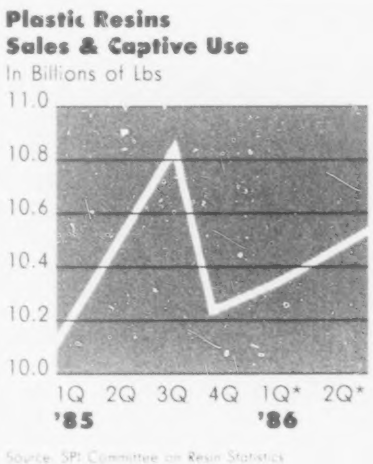
Industry sources generally expect that the engineering plastics and composites will continue to chip away at metal applications, particularly in the automotive and aircraft sectors. Final figures for 1985 showed apparent consumption of thermoplastics was 33.76 billion lbs, of which imports claimed about 4 pct. Apparent consumption of thermosetting resins was 5.61 billion lbs, of which imports claimed a narrow 1 pct.

In terms of sales and captive uses, thermoplastic polyester resins were up 11.2 pct to 955.7 million lbs and the nylon resins managed a 3.6 pct gain to 402.9 million lbs. The epoxy resins, which find their way into electronics and aerospace composites applications, slipped 3.6 pct to 367.2 million lbs. Sources said aerospace uses held up quite well and the decline reflected last year's softer electronics markets.

Coil coatings continue to gain an increasing share of the coatings market in the appliance industry.


Industrial Coatings Shipments
In Millions of Gallons

Source: U.S. Department of Commerce
*IA estimate

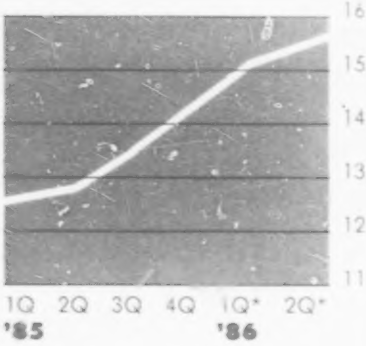

Plastic Resins Sales & Captive Use
In Billions of Lbs

Source: SPI Committee on Resin Statistics as compiled by Ernst & Whinney
*IA estimate

COMPUTERS; INSTRUMENTS & CONTROLS

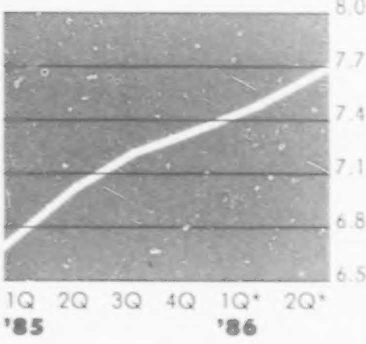
Computer sales now are up several percentage points from 1985's pace.

Computers Shipments
In Billions of Dollars



Source: U.S. Department of Commerce
*IA estimate

Instruments & Controls Shipments
In Billions of Dollars



Source: U.S. Department of Commerce
*IA estimate

COMPUTERS—Though not yet its old self, the computer industry appears to be emerging from the doldrums. Last year soft domestic sales coupled with increased imports gave the industry an 8 pct growth rate compared with 25 pct in 1984.

This year growth is expected to top 16 pct. Based on first quarter observations, that expectation is reasonable. Sales now are up several percentage points from 1985's pace and growth should continue through the second quarter and beyond.

Last year was a year of caution. Emphasis shifted from buying new computers to making better use of existing models. The inability of computers to communicate with each other became a major concern. Financially strapped, firms delayed buying in anticipation of improved technologies.

This year is different. Promised technologies are here, or soon will be. For example, the Sierra series mainframes from IBM and the DEC Microvax II workstations are now available. RISC machines from IBM and Hewlett-Packard based on reduced-instruction-set-computer architecture are weeks away. These machines promise improved speed through design simplicity.

From all indications, business in general is healthier this year. Improved profit coupled with better products to spend it on is turning computer sales around.

However, all is not roses. Managers are still cautious about their purchases. Lack of communication between computers is a problem. Networking technology still has a way to go. Also, the growth of imports is a continuing concern. However, with the strength of the dollar against other currencies declining, exports, which picked up considerably last year, should be even stronger over the next several quarters.

INSTRUMENTS & CONTROLS—Shipments of instruments and controls (now called industrial and scientific instruments by the U.S. Commerce Dept.) reached $28.5 billion in 1985 and should grow at a current rate of 5.7 pct in 1986.

Of the three major classifications of instruments, the most relevant to manufacturing is *measuring and controlling instruments* (the other two being *scientific instruments* and *instruments to measure electricity*).

Measuring and control products are up several percentage points in sales this year due to increased spending by manufacturers. However, this growth is not universal. For example, major users of process controls, namely steel and domestic oil and gas industries, remain depressed and therefore uninterested in new controls. In addition, many manufacturers, facing increased competition, are cutting back on new equipment purchases or sending their manufacturing overseas.

New construction typically pushes up sales of a variety of instruments. Industrial construction, still recovering from the last recession, but spurred on by receding interest rates, is expected to grow by 10 pct in 1986.

Manufacturing capacity utilization and profits, leading indicators of future construction, are fairly high and getting stronger.

Because the instruments and controls industry is so broad a category, perhaps the best indicator of the strength of the industry is the general state of the economy. And here experts are guardedly optimistic. Predictions of moderate growth both in the U.S. and abroad for the first half of 1986 should hold true for the sales of instruments and controls.

Export sales, in particular, are picking up and should strengthen.

(Cont. on p. 57)

APPLIANCES; MATERIAL HANDLING

APPLIANCES—Records continue to be set by the appliance industry in the U.S., even after setting a new mark, for the second consecutive year, during 1985. Nearly 41.8 million major appliances were shipped in 1985, beating the previous record by more than 2.3 million units, according to the Association of Home Appliance Manufacturers.

December and fourth-quarter shipments established new record highs of 2.9 million and 10.1 million units respectively. Fourth quarter shipments were 6 pct greater than in the same quarter in 1984.

The torrid pace extended into January, with shipments at 3.6 million units, a record.

Prospects for the rest of the quarter and first half of 1986 continue to look good. Interest and mortgage rates are still declining and the demand for new homes is increasing. Housing starts, while fluctuating on a monthly basis, are on an upward trend and started off with a 15.7 pct jump in January, according to the U.S. Dept. of Commerce.

If this pace continues it could translate into 2.09 million housing units for 1986. However, the department does not see it as lasting through the year and projects a slight decline to 1.74 million units.

To put things into perspective, one-fourth of 1985's shipments, at 10.8 million units, were microwave ovens, up 19 pct over the record set in 1984. Food disposers also set a new annual record at 1.1 million units. December tally also showed refrigerator shipments up 18.8 pct; electric ranges, up 15.7 pct; automatic washers, up 14.2 pct; dishwashers, up 15.8 pct; and dryers, up 10.3 pct.

According to the current forecast, the appliance industry expects shipments to reach 40 million units this year and 39.8 million units in 1987.

MATERIAL HANDLING—A major materials handling equipment maker sees his company's second quarter bookings up by 10 pct over the first quarter.

Since about 60 pct of his business is automotive and related industries, he said, "the auto companies are making the difference."

Other systems executives noted continuing strength in the food and beverage markets, and firm electronics markets through the second half. But the automatic pallet business currently is flat, one industry spokesman said.

Another AS/R systems manufacturer noted that his backlogs are in good shape, but kept stressing that although custom warehousing systems have a broad market—from steel to electronics—it's hardly a case of 'easy come' these days.

"You're busy bird-dogging and quoting, you're doing more for what you get and straining to keep up," he explained.

Still, he's pleased with the high-end, sophisticated segment of the industry and sympathizes with the industrial forklift truck makers.

Driven to severe price-cutting tactics, one truck manufacturer admitted slashing prices 30 pct over the past three years. This is not unusual. But truck makers are tempted to discount because of quick turnover.

As one industry source put it, "we settle for half a loaf."

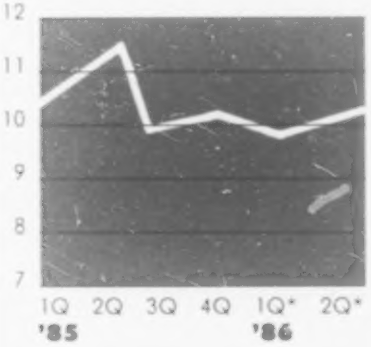
Price-cutting combined with automation's reduction in labor costs, is also hyping the market for automated guided vehicles. They present an attractive package—attractive enough to "pry some capital out of otherwise tight-fisted customers."

Meanwhile, German, Japanese and Korean imports continue their assault on the U.S. forklift market.

Some glitches aside, this industry continues to enjoy good growth.

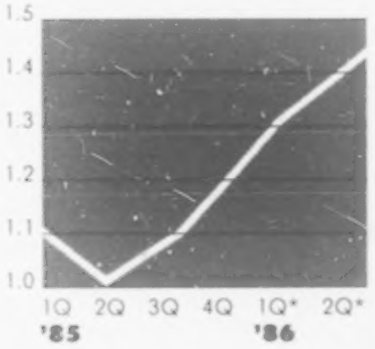
The appliance industry's prospects for the first half of 1986 continue to look good.

Appliances, Shipments
In Millions of Units



Source: Assn. of Home Appliance Manufacturers
*IA estimate

Material Handling Shipments
In Billions of Dollars

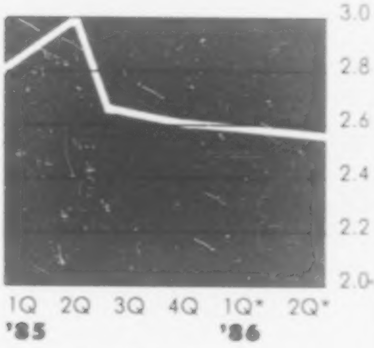


Source: Material Handling Institute
*IA estimate

CASTINGS; FORGINGS

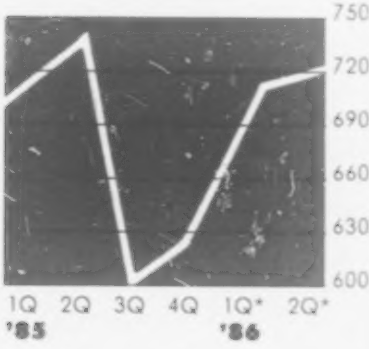
The ferrous castings industry overall is expected to drop 3 pct in shipments in 1986.

Ferrous Castings Shipments
In Millions of Tons



Source: U.S. Department of Commerce and Iron Castings Society
*IA estimate

Impression Die Forgings Shipments
In Millions of Dollars



Source: Forging Industry Assn.
*IA estimate

CASTINGS—Shipments of ferrous castings continue to slip ever so gradually. Business ended up the year on the downside, although orders seem to be holding their own through the first quarter.

More of the same is predicted for the second quarter. After that, the predictions from industry members become gloomier.

The first quarter appeared to be about down a slight fraction from the fourth quarter of 1985, but down some 7 pct from last year's first quarter. One explanation for this slump is the annual 2 million to 3 million tons of castings, either in the form of castings or in assemblies, imported from such countries as Brazil, India and China.

More than 25 pct of the domestic iron foundries have disappeared from the scene, and imports have contributed to their demise.

The farm implement producers have been described as having "an enormous overhang in inventory." Activity coming from manufacturers of construction equipment is slightly better, while the heavy truck industry is down, thus, diesel engines are down as well.

According to one source, new programs within the automotive industry have made the castings business jump a little in Detroit, but this activity is supposed to be temporary.

One forecast presupposes that the ferrous castings industry overall will drop 3 pct in shipments in 1986, compared to a much more severe 7 pct decline in 1985.

Declining gray iron castings shipments are blamed for pulling down the statistics. Ductile iron is increasing by a rate of about 3 pct in shipments, while malleable iron castings are increasing by about 1 pct.

But, the health of the ferrous castings industry will be determined by automotive.

FORGINGS—Forging, a depressed industry in 1985, is expected to show little improvement in 1986. Orders for the first months of this year are up slightly from the same period last year.

For some industry executives that gain provides little or no encouragement, because 1985 orders were a disappointing 15 pct below 1984 totals, and 1984 was not a great year either.

The industry is facing a double whammy. Many traditional buyers of forgings—off-road and farm equipment manufacturers, and oil field equipment suppliers—remain mired in depression. This long-term loss of markets in conjunction with a dramatic growth of forging imports has resulted in the closing of many smaller forging shops and a pessimistic outlook by those still operating.

Imported forgings are flooding into this country both as components of imported finished products: Japanese automobiles, for example, and as parts for domestic producers. Major users of forgings have substantially increased their purchases of foreign forgings.

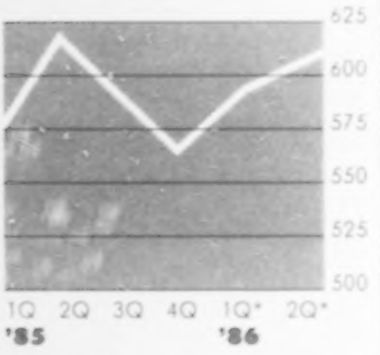
On the bright side, the continuing strength of domestic car and truck production is giving the forging industry a much needed lift. Automotive production is expected to remain strong for another year, although 1986 output is not expected to top 1985 levels.

Another area of strength is the defense and aerospace industry. In recent months, new orders for commercial aircraft have risen. As a result, some forging companies have received major orders and additional orders should follow throughout the year. With defense spending still strong, the industry members serving that market foresee a steady demand.

WELDING; HEAT TREATMENT

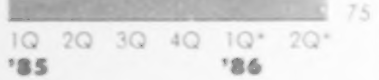
Only two major markets for welding equipment and electrodes are strong.

Welding Shipments
In Millions of Dollars



[illegible]
Source: National Welding Supply Association
*IA estimate

Heat Treatment
In Millions of Dollars



▬ Sales of Commercial Heat Treaters
■ ■ ■ Heat Processing Equipment Orders
Source: Industrial Heating Equipment Assn. Metal Treating Institute
*IA estimate

WELDING—In any discussion of the economic climate within the welding industry, there are two main sources of information. One is the domestic manufacturers of welding equipment and electrodes, and the other, the welding distributors.

The word from the manufacturers is not good, mainly because the industry experienced a precipitous 25 pct drop in business during the third quarter of 1985. Sales returned to normal in the fourth quarter and they will probably stay that way through the rest of 1986.

The news is more cheerful from the National Welding Supply Association, Philadelphia, the statistic gathering body of the distributors. The association says a steady improvement in business is underway.

Looking back, the manufacturers enjoyed a 3 pct gain in dollar volume of welding equipment from 1984 to 1985. Welding electrodes, on the other hand, decreased by 5 pct during the same period. Imports are starting to come in, the amount increasing from 9 pct in 1984 to 13.5 pct in 1985, most of them in welding electrodes. Canada and Mexico lead the list of exporters.

Of the eight or so major markets for welding equipment and electrodes, only two, automotive and aerospace, are strong. Also very strong is the small shop with its 225 amp or less power source. Repair welding is holding its own.

Including gases for arc shielding and cutting, the welding industry had a $2.6 billion year in 1985. There are those who believe 1986 will be a $3 bilion year. *Iron Age* isn't so sure about that.

To achieve that goal, there will have to be some dramatic turnarounds in such industries as power plant construction, pipelines or offshore construction, all major users of welding.

HEAT TREATMENT—Heat treating continues to do fairly well.

Commercial heat treaters in the Houston area say business is way off from the first quarter of 1985, but it's on a par with the fourth quarter of 1985. Littler improvement is seen there for the second quarter.

The strongest segments are aerospace and automotive. Both had good fourth quarters, have just finished up with strong first quarters and look forward to equally strong second quarters. Both industries also are a few percentage points ahead of the same periods in 1985.

Heat treating for the construction and farm equipment industries has picked up only slightly over the fourth quarter.

Overall, commercial heat treating in the first quarter is down about 0.25 pct from the fourth quarter but is up about the same amount over the first quarter of 1985. Again overall, it looks like commercial heat treating activity might drop another fraction of a percent in the second quarter.

Business has been volatile over the past 12 months, according to the builders of heat-treating equipment. However, indications are that business has started to flatten out there there as well.

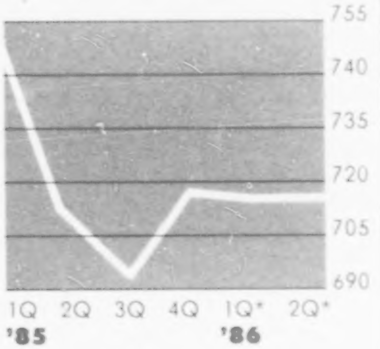
Sales jumped 16 pct from the fourth quarter 1985 to the first quarter 1986. The second quarter looks like it will only have a half percent or so decrease from the first quarter. So far this year, conditions look slightly better than the same period in 1985.

One furnace builder noted that aerospace and defense are very strong and that automotive is holding its own, though no upturn is envisioned there. He also saw no strong upturn in the farm implement industry. Out-sourcing has a lot to do with it.

FASTENERS; STAMPINGS

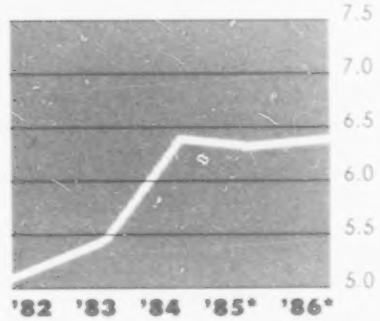
The fastener industry could remain in a holding pattern for the next several months.

Fasteners, Sales
In Millions of Dollars



Source: Industrial Fasteners Institute
*IA estimate

Stampings Shipments
In Millions of Dollars



Based on the average of a control group whose shipments total more than $500 million annually
Source: American Metal Stamping Assn.
*IA estimate

FASTENERS—Depending on whom you contact, the fastener industry will be on a yo-yo in the new quarter.

Those selling custom-formed parts (specialty lines), may average out at a 3 to 4 pct increase in sales. But one optimistic Eastern maker, for instance, sees his firm's orders soaring by 8 pct in the second quarter compared to the first three months of 1986, thanks mostly to the aerospace market.

Unfortunately, the mechanical fastener end of the industry will continue to be bloodied by imports. More than half of the nuts, bolts, washers, rivets or screws bought in the U.S. today are imported.

This leads one industry analyst to conclude that the overall fastener industry could remain in a holding pattern for the next several months.

Among domestic-made fasteners, about a third head for auto and truck manufacturers, so fastener makers that supply this market are still optimistic. (Domestic car sales withered a bit in late January, but new incentives should help to restore the sales bloom).

Likewise, commercial aircraft and appliances are strong, and the defense sector will provide some new business, though it may turn out to be more expectation than reality. Congress keeps snipping at the Reagan defense budget and the effect of the Gramm-Rudman law is yet to be felt.

The softer dollar likely will do little to help U.S. exports of special fasteners. According to a Midwestern manufacturer, the overseas market is limited to overhauling or maintenance.

Small parts orders to the electronics industry are expected to remain brisk in the second quarter. Orders from steel, bridge-building and off-road vehicle industries will be down.

STAMPINGS—One report earlier this year suggested that the stamping industry's shipments would match the 1985 pattern. A plateau is anticipated for most of 1986, "with the possibility of a slight decline in activity later in the year."

If this holds up, second quarter orders will total $1.6 million, with shipments at $1.7 million.

In the meantime, say several industry members, some brighter signs have appeared on the industry's horizon that could boost sales by perhaps 2 to 3 pct this year.

As one stamping executive in the Midwest explained: "It does look better out there, not sensational, but certainly better than if you had caught me a month ago."

Despite the late January falloff in domestic car sales, stampers supplying the auto industry seem confident this will turnaround shortly. The automakers hope to retain their sales momentum through special financing deals. In addition, price-cutting from the oil glut should encourage big car sales as gasoline pump prices drop.

Similarly, stampers that supply the appliance market see their market on the upswing this year. Following January's turnaround in starts of single and multi-family houses, builders' sales of appliances likely will rise from already record levels. Also, stability in consumer confidence should ensure replacement demand.

Stampers supplying office machinery, computers or medical instruments appear to be on safe ground; those that sell to farm machinery manufacturers see little improvement.

Meanwhile, lead times are running about six to eight weeks. Most U.S. companies have learned the wisdom of low inventories, and stampers are no exception.

AIRCRAFT

The commercial aircraft business promises to be a busy one for the major airframe companies in 1986 if only for the effect of last year's surge in orders for jetliners on the industry's healthy backlog.

That increase was anywhere from 40 to 80 pct, depending on who's counting how far down the size range. One estimate for Boeing, McDonnell Douglas, and Airbus put net orders up 42.5 pct (excluding aircraft below 110 seats) while another marked the scorecard up better than 80 pct.

The airframe companies aren't about to write 1986 off yet as a so-so year for orders pending a closer look at a few clouds on the horizon.

Both traffic and load factors were showing signs of flattening out as the year began. Also, the drop in the value of the U.S. dollar was seen dampening enthusiasm here for travel abroad. On the other hand, this could mean more traffic originating overseas.

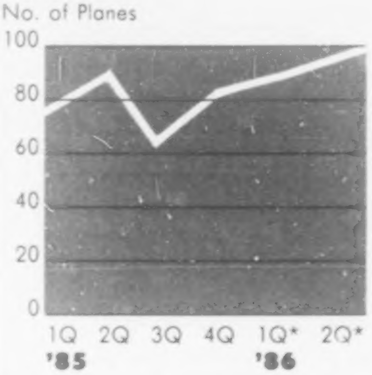
Airline capacity estimates point to another increase this year. They range from 4 to 6 pct, depending on how much weight is assigned to tougher maintenance schedules in the wake of added emphasis on airline safety. Some of the increase in capacity can be credited to the sizable jump in jetliner deliveries last year. It was something like 33 pct, although most of the increase was in the smaller aircraft, with the rest in the mid-size range.

Estimates for 1986 deliveries of jetliners range from 5 to 15 pct, with the third and fourth quarters expected to be the busiest.

Sales growth slowed on the military side of the aerospace business in 1985. The Administration's budget proposals promise further growth this year, but Congress and the Gramm-Rudman law could halt any increase and kill off some new programs as well.

Estimates for 1986 deliveries of jetliners range from 5 to 15 pct, with the second half likely to be the busiest.

Commercial Airplane Deliveries



Source: Airbus Industrie, Boeing and McDonnell-Douglas
*IA estimate

ALCOA TECHNOLOGY CONTRACT SERVICES

Let Alcoa show you how to weld aluminum.

Order this free booklet which explains our welding consultation and training services which can be conducted at your work site.

Alcoa Welding
Consultation
Services

Welding aluminum is not difficult, just different. Alcoa's welding specialists can assist you in finding the solution to your aluminum welding problems as they have for others—and they can do it at your facility with your welders and your equipment.

Areas covered are ▪ type welding process ▪ joint design ▪ filler alloy/base alloy compatibility ▪ precleaning procedure ▪ welder's technique ▪ welding parameters and procedures.

Put Alcoa's technical experience to work to train your welders, improve methods, recommend equipment needs and modifications.

Although this service is on a fee basis, it could be one of the best investments you ever made.

ALCOA

For more information, send coupon today.

Aluminum Company of America
Technology Marketing Division
455-D Alcoa Building
Pittsburgh, Pennsylvania 15219

Please send your free welding booklet to:

Name
Title
Company
Address
City
State Zip
Phone

For Information, Circle 150

PRICE & PRODUCTION DATA

(Effective March 17,1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	192	191	202	197
Pittsburgh	254	252	219	235
Youngstown	116	113	110	120
Lake Erie	156	161	137	168
Detroit	147	148	141	151
Chicago	483	491	501	477
Midwest	161	159	178	175
Southern	202	212	210	223
Western	91	90	89	103
U.S. Production	1,803	1,817	1,787	1,849

Source: American Iron & Steel Institute

Lake Superior Ore Prices

[illegible]

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

[illegible]

STEEL PRODUCTION, COMPOSITE PRICES

(Effective March 17,1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,803	1,817	18,707	17,295
Capability Utilization Rate	72.3	72.8	70.9	63.2

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 1/1/86)	24.607	24.607	24.607	27.582
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 73.50	$ 73.50	$ 75.50	$ 86.83
No. 2 bundles	$ 53.83	$ 52.83	$ 53.83	$ 57.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 73.50	$ 73.50	$ 76.50	$ 92.50
No. 1 steel, Philadelphia	72.50	72.50	72.50	82.50
No. 1 steel, Chicago	74.50	74.50	77.50	85.50
No. 1 bundles, Detroit	65.50	65.50	70.50	87.50
Low Phos., Youngstown	73.50	73.50	76.50	78.50
No. 1 mach'y cast., Pgh	73.50	73.50	68.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	98.50
No. 1 mach'y cast., Chi	109.50	109.50	109.50	111.50

[illegible]

NONFERROUS PRICES

[illegible]

Primary Metal Prices

(cents per lb.)	Current price	Last price	Date of change
Aluminum (LME)	52.07	51.89	3/17/86
Copper (C)	70.00-72.00	69.00-72.00	3/17/86
Lead	18.00-19.00	17.75-19.00	3/4/86
Magnesium ingot	153.00	148.00	12/9/85
Nickel (LME)	186.62	186.26	3/17/86
Zinc	35.00	38.00	11/6/85

[illegible]

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.25
Calcium, ton lots, crown	$3.92
Chromium 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$349.90
Indium, dollars per troy oz.	$2.50
Iridium, dollars per troy oz.	$460.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb. f.o.b. N.Y.	$240.00-260.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.00-3.13
Palladium, per troy oz.	$111.00
Platinum, per troy oz.	$413.00
Rhodium, per troy oz.	$1,130.00
Silver ingots, per troy oz.	$5.77
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd. red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

[illegible]

Mar. 10 — 341.98	Mar. 13 — 314.56
Mar. 11 — 321.41	Mar. 14 — 306.13
Mar. 12 — 318.51	

Scrap Prices
Brass Mill Scrap

[illegible]

	Solids	Turnings
Copper	61	57
Yellow brass	51½	46
Red brass	56	49½
Comm. bronze	57½	52½
Mang. bronze	44	43
Free cutting rod ends	49	45

Custom Smelters Scrap

[illegible]

No. 1 copper wire	61
No. 2 copper wire	53
Light copper	44

Ingot Makers Scrap

[illegible]

No. 1 copper wire	57
No. 2 copper wire	49
Light copper	40
No. 1 composition	46
No. 1 comp. turnings	45
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	27
Radiators	35

Aluminum		
New mixed clips	41	— 42
Old sheet	38	— 39
Old cast	38	— 39
Clean dry borings	38	— 40

Dealers' Scrap

[illegible]

Aluminum

Segregated clippings	29	— 30
Mixed I.C. clips	25	— 26
Old sheets and cast	23	— 24
Borings and turnings	19	— 20
Duraluminum clippings	25	— 26

Copper and Brass

No. 1 copper wire	48	— 49
No. 2 copper wire	40	— 41
Light copper	33	— 34
Radiators	31	— 32
No. 1 composition	39	— 41
No. 1 composition turnings	36	— 37
Cocks and faucets	29	— 30
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 16
Old diecast zinc	11	— 12

EFFECTIVE MARCH 17, 1986

(Effective March 17, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 73.00 to	$ 74.00
No. 2 hvy. melting	63.00 to	64.00
No. 1 dealer bundles	[illegible]	[illegible]
No. 1 factory bundles	[illegible]	[illegible]
No. 2 bundles	[illegible]	[illegible]
No. 1 busheling	[illegible]	[illegible]
Machine shop turnings	8.00 to	9.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	42.00 to	43.00
Low phos. punchings plate	[illegible]	[illegible]
Heavy turnings	[illegible]	[illegible]
No. 1 RR hvy. melting	[illegible]	[illegible]
Rails, 2 ft and under	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
RR specialties	[illegible]	[illegible]
No. 1 machinery cast	[illegible]	[illegible]
Cupola cast	[illegible]	[illegible]
Heavy breakable cast	[illegible]	[illegible]
Stainless		
18-8 bundles and solids	[illegible]	[illegible]
18-8 turnings	[illegible]	[illegible]

Chicago

[illegible]	[illegible]	[illegible]

Philadelphia

[illegible]	[illegible]	[illegible]

Detroit

Brokers buying prices per gross ton on cars

[illegible]	[illegible]	[illegible]

Youngstown

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	56.00 to	57.00
No. 1 dealer bundles	73.00 to	74.00
No. 2 dealer bundles	[illegible]	[illegible]
Machine shop turnings	24.00 to	25.00
Shoveling turnings	27.00 to	28.00
Low phos. plate	77.00 to	78.00
Electric furnace bundles	[illegible]	67.00
Galvanized bundles	[illegible]	[illegible]

Cleveland

[illegible]	[illegible]	[illegible]

Buffalo

[illegible]	[illegible]	[illegible]

St. Louis

[illegible]	[illegible]	[illegible]

Birmingham

[illegible]	[illegible]	[illegible]

Cincinnati

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	77.00 to	78.00
Rails, random length	59.00 to	60.00
Rails, 2 ft and under	79.00 to	80.00
No. 1 cupola cast	66.00 to	67.00
Heavy breakable cast	27.00 to	28.00
Drop broken cast	72.00 to	73.00

New York

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	440.00 to	450.00
18-8 turnings	[illegible]	380.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
[illegible]	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredded scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	79.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 43.00 to	$ 45.00
No. 2 hvy. melting	37.00 to	39.00
No. 1 dealer bundles	34.00 to	36.00
No. 2 dealer bundles	22.00 to	24.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
[illegible]	[illegible]	62.00

Los Angeles

[illegible]	[illegible]	[illegible]

Seattle

[illegible]	[illegible]	[illegible]

Hamilton, Ont.

[illegible]	[illegible]	[illegible]

Houston

[illegible]	[illegible]	[illegible]

THE PLODDING TREND HOLDS FOR ORDERS

Orders data for January shows that the year got off to a less-than-rousing start.

The data showed orders for the month up by 1.3 pct to $108.9 billion. But exclude a big jump in orders received by defense-related capital goods producers, and the picture changes.

Defense capital goods orders in January were up a high-flying 45 pct from December. That big lift put these orders at $10.3 billion for the month.

Another big gainer in January was the auto industry. Sales incentives offered by auto companies helped push these orders up by more than 14 pct.

But that was about the whole ballgame for orders' gains during the opening month of the year.

Both electrical and nonelectrical machinery lines were soft in January. As government orders analysts noted, "There was a mixture of increases and decreases in both categories."

As the year started, the pattern of orders seemed to reflect the record over the year past. Any hint of a broad or strong upswing in orders seems to be missing.

Last year, orders rose in six of the twelve months and declined in the other six months. The year's total orders were up 3.7 pct—which comes out a wash after allowing for higher price tags.

Apparently, business executives themselves are not feeling buoyant about the orders situation. For example, inventories in January continued a 10-month downward trend.

The best hope for some action in orders would seem to lie in forecasts for a stronger economy this year than for last year.

But, even a stronger economy can't help much if imports continue to roll in at their current levels.

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted Source: U.S. Dept of Commerce		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	1st Qtr*	$402.1	$389.0	$371.2
Manufacturing, Total	1st Qtr*	154.7	155.7	145.7
Manufacturing, Durable Goods	1st Qtr*	74.6	73.5	69.9
Mining Industry	1st Qtr*	15.3	15.2	15.7
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	Jan.	108.9	107.5	105.4
Shipments	Jan.	106.1	105.8	102.0
Inventories	Jan.	188.6	189.2	192.2
Unfilled Orders	Jan.	355.8	353.0	350.0
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	Jan.	24.6	30.6	23.6
Capital Goods Producers Defense Industries	Jan.	10.3	7.2	11.1
Primary Metals, Total	Jan.	10.5	10.1	10.8
Steel (SIC 331)	Jan.	4.2	4.1	4.7
Iron & Steel Castings (SIC 332)	Jan.	1.5	1.1	1.3
Nonferrous Metals	Jan.	4.8	4.9	4.8
Nonelectrical Mach.-Equip. Industries, Total	Jan.	15.9	16.2	15.3
Engines & Turbines	Jan.	1.3	1.7	1.1
Farm Machinery & Equipment (Shipments)	Jan.	0.9	0.8	0.7
Construction, Mining & Mat. Hdlg. Equip	Jan.	3.1	2.9	2.6
General Industrial Machinery	Jan.	1.4	1.3	1.2
Fluid Power Equipment** (Index-1972=100)	Jan.	292.0	236.0	296.0
Metalworking Machinery	Jan.	0.8	0.6	0.9
Machine Tools, Total ($Mill., Unadjusted)***	Jan.	188.7	175.0	211.5
Machine Tools, Metalcutting***	Jan.	135.0	116.6	137.8
Machine Tools, Metalforming***	Jan.	53.7	58.4	73.7
Electrical Mach. & Equip. Industries, Total	Jan.	16.0	16.3	17.9
Elec. Transmission Equip. & Ind. Apparatus	Jan.	2.1	2.0	2.0
Household Appliances	Jan.	1.4	1.5	1.5
Communication Equipment	Jan.	5.3	5.2	7.6
Transportation Equipment, Total	Jan.	31.3	31.0	27.8
Motor Vehicles & Parts (Shipments)	Jan.	19.5	17.4	18.4
Aircraft, Missiles & Parts	Jan.	11.2	13.0	8.3
Shipbuilding & Military Tanks	Jan.	-0.1	0.3	0.6
Fabricated Metal Products, Total	Jan.	14.2	14.1	13.6
Instruments, Total	Jan.	4.9	5.0	4.6

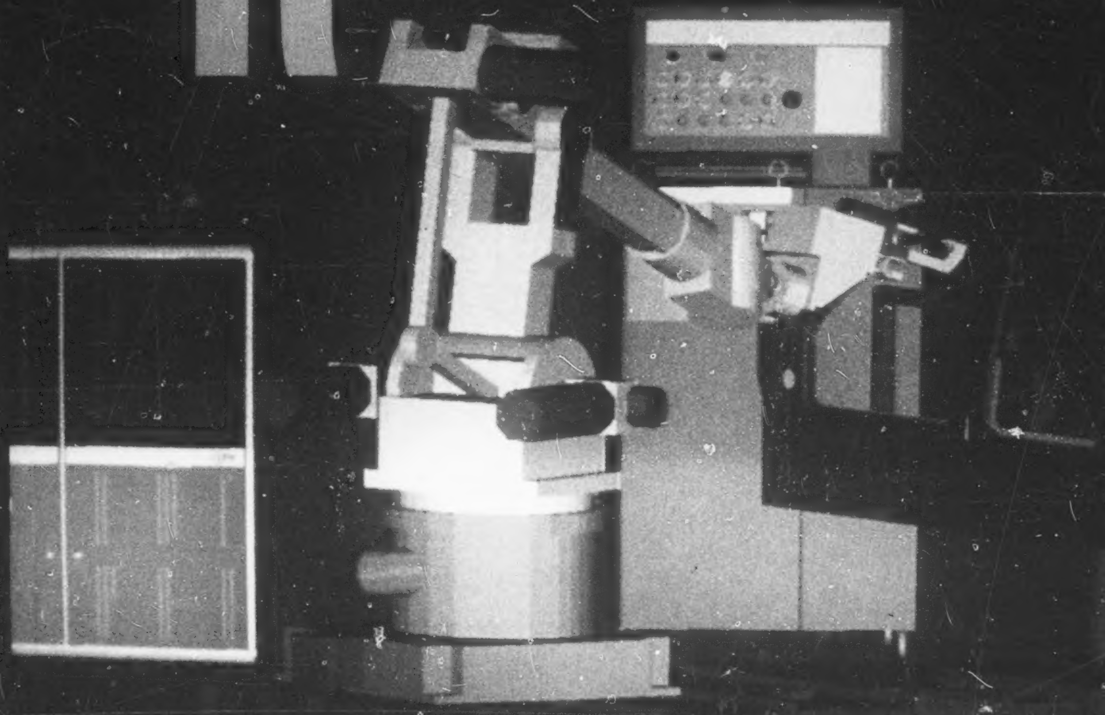
*Est.—Commerce Dept. **Source: National Fluid Power Assn., ***Source: NMTBA

C2150-8

IRON AGE
APRIL 18, 1986

MANUFACTURING MANAGEMENT

ROBOTICS EXTENDS ITS REACH IN THE FACTORY



IS U.S. MANUFACTURING
TING ITS KNOW-HOW?

–THE BLUEPRINT
FOR MAZDA'S U.S. ASSEMBLY PLANT

APRIL 18, 1986 VOL. 229, NO. 8

IRON AGE
MANUFACTURING MANAGEMENT

Editorial 7
Patience is no small virtue.

Newswatch 11
House leaders are pushing for a trade reform law by mid-May.

You and Your Job 20
The eyes have it... when you're talking VDTs.

Management Know-How 21
Is U.S. manufacturing exporting its expertise?

Mazda 28
Is Hofu the blueprint for its U.S. assembly plant.

Robots 33
Robotics extends its reach in the factory.

Cressona 41
Aluminum extruder concentrates its focus to stay ahead.

Signode 47
The Midwest company is pursuing new products and businesses.

Westec 50
Industry is crying out for help.

ASEA Press 52
Aircraft technology is helping European automakers.

Technically Speaking 54
Forging and testing cells working at Pratt & Whitney.

Materials Report 61
Is increased demand the real reason for the gain in steel orders?

Price Trends 68
Now, the question is, where's the bottom?

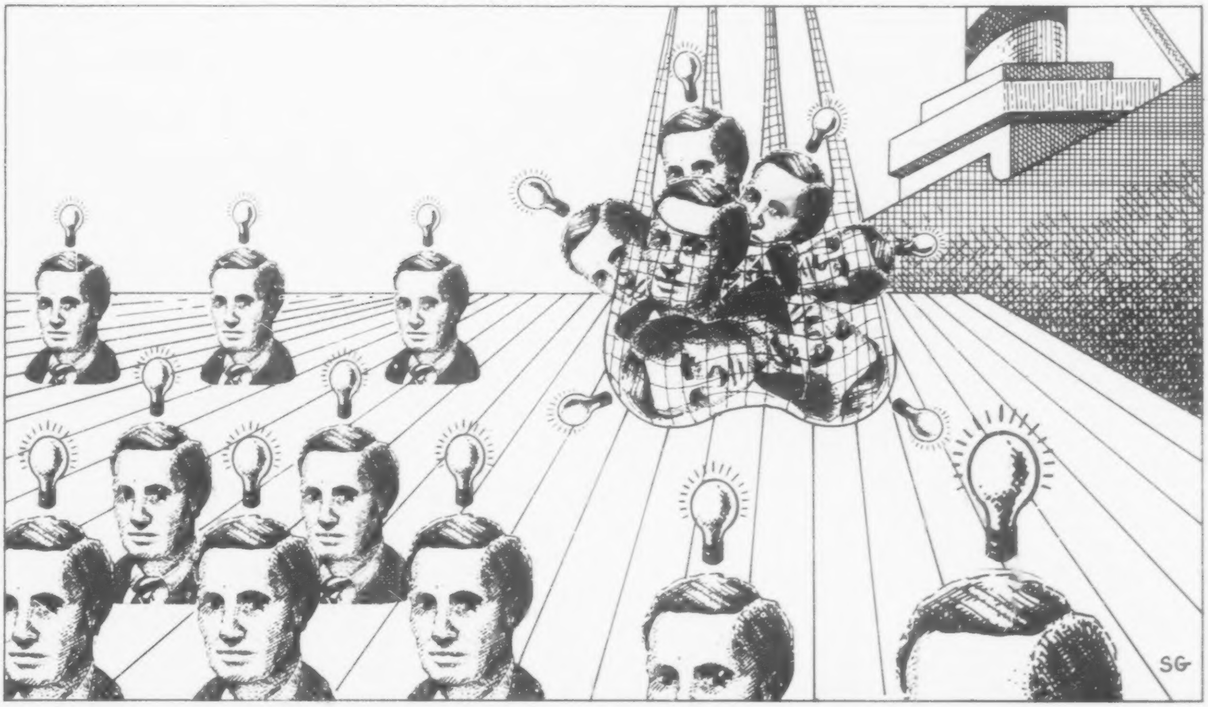
Next Issue: Steel's Leapfrog Technologies.

Departments

EDITORIAL STAFF 8
LETTERS 8
PRODUCT & EQUIPMENT REVIEW 55
FREE LITERATURE 57
AD INDEX 58
BUSINESS STAFF 58
MANAGEMENT SERVICE CARD 59
P&P DATA 3/31 64
FERROUS SCRAP 3/31 65
CLEARING HOUSE 66

IRON AGE (USPS 269-180) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year, $85 Canada, Foreign (24 issues). Metalproducer edition—$30 one year, $56 Canada, Foreign (12 issues). Single copies $3.00. Cable: Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 3017, Wheaton, IL 60189.

Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES



MANUFACTURERS RISK LOSS OF KNOW-HOW

Many manufacturers are trimming output. Others are importing heavily. And some have foreign joint venture partners making goods for them. Is loss of manufacturing know-how a real danger?

BY JOHN D. BAXTER

A growing number of trend-spotters these days are hailing a 'watershed change' in U.S. manufacturing. A label sometimes put on this change is 'de-manufacturing.'

The term relates to the growing number of U.S. manufacturers that are having others make their products for them, are diversifying into non-manufacturing lines, or are giving up on manufacturing.

Usually, the 'others' making products for U.S. manufacturers are foreign producers—either import sources or joint venture partners. In many other cases, U.S. manufacturers buy foreign-made products and act as distributors for them.

Notably, many leading U.S. basic goods manufacturers are in the forefront of the movement.

This sweeping trend is causing concern among some U.S. business leaders and economists. The products farmed out, or purchased, are often high value-added ones that entail high degrees of production know-how.

Concern centers on the question of whether the growing trend points to a serious loss of know-how in manufacturing technology by U.S. producers.

Harvard economist Robert B. Reich, in a recent article, flatly stated that the proliferating joint ventures of U.S. manufacturers with Japanese producers, "give away our future." The 'giveaway,' as he sees it, is in the loss of manufacturing knowledge and experience.

Another analyst sees a new type of company emerging—"one that may design and distribute but doesn't actually make anything."

Five Paths

The pull away from manufacturing by U.S. companies follows five general patterns.

For one, there are manufacturers that have aggressive attitudes and policies of a make-or-buy nature. In these companies, when competitive cost analysis points to a 'buy' action, that is what is done. One management consultant has noted that about 70 pct of all the make-or-buy analyses of which he is aware "gave the green light to "buy' decisions."

A second approach to limiting

manufacturing involvement is a joint venture arrangement between two manufacturers. It seems the most common of these arrangements is between U.S. and Japanese companies. Also, the production involving the higher value-added items usually is left to the Japanese partner. This is true in the auto industry where General Motors, Ford and Chrysler all have joint ventures with Japanese auto firms. All plant design and product engineering has been left to the Japanese partners.

A third approach in manufacturing realignment in this country is where companies cease, or lessen, domestic production and set up foreign plants. This can have a chain reaction as U.S. supplier manufacturers often follow their customers overseas. Case in point: Parker Hannifin Corp., a leading maker of fluid power products. Explained company executives recently, "Many of our customers are moving product manufacturing to lower-cost plants and requiring that we support them with locally-manufactured products." This was noted as the company recently announced plans to set up Asian operations. The company is already supplying U.S. manufacturers from its operations in Europe.

A fourth approach U.S. producers are taking to cope with slipping markets or competitive pressures is to diversity into other lines of business, often non-manufacturing lines. A good example of this is seen in U.S. Steel Corp.'s diversifying into oil. Steel products now account for less than one-third of the annual revenues of the corporation.

A fifth approach used to escape a manufacturing burden is for a company to pull out of manufacturing altogether. Ogden Corp., formerly in lines like shipbuilding, machine tools and metals processing, is now totally a services company—by management design and intent.

When It Started

Some quick history is in order to bring all the de-manufacturing forces together and put a starting time on them.

A consensus puts the start of the so-called de-manufacturing trend in the years 1979-80. Those years, and those immediately following, turned out to be all-hell-broke-loose years for U.S. manufacturing.

First, U.S. economic growth flopped badly from early 1979 through 1982. It was not a matter of slowed growth; there was actual negative growth of 5 pct over that period. For any practical meaning, 1980-82 was a three-year recession period. There were two recessions in the time span with slow growth all around them.

In those years of economic contraction, the prime interest rate averaged more than 16 pct. Manufacturers in mature industries (where most de-manufacturing is now occurring) were staggered. Those industries were, and are, ones with relatively slow growth rates. Too, they are capital-intensive industries. Record high credit costs hit them with a special fury.

On top of that, the U.S. dollar began its sickening spiral. The take-off year was 1981 when the dollar's exchange value with leading world trade competitors jumped by 15 pct.

Little wonder then that the U.S. trade balance in manufactured goods went from a $19 billion *surplus* in 19[illegible] to a steady collapse over subs[illegible] years to a $101 billion *defic*[illegible] 1985.

The effect of all these developments was that U.S. manufacturing—again, chiefly basic goods producers—were driven to the wall. In a disinflating economy, they couldn't get relief through price tag boosts on their products. The world was already under-pricing them. They had to retrench, cut costs. But many couldn't cut costs fast enough or deep enough.

So, they joined with others to gain strength, they diversified out of hard-hit lines and some even started on the path to exiting manufacturing altogether.

There are, as noted, scary implications for the economy in the pull away by so many companies from manufacturing—especially, the high value-added areas of manufacturing. If, in the U.S. economy, there is a serious loss in manufacturing technology know-how, this could affect living standards and national security.

Some analysts have noted that this country has already lost much of its know-how in making consumer electronic products.

"There are four production sectors of the economy where most wealth is created," noted Lee Hamilton, senior vice president of the National Association of Manufacturers (NAM). "Those sectors are agriculture, forestry and fisheries, mining and, of course, manufacturing. Those sectors create wealth because they take raw materials and other goods and add value to them.

"By comparison, those in the service industries are in fact serving the production industries. There would be no need, in a great many cases, for service industries if the production industries were not adding value to products. And that's why, even with the great employment growth in services, manufacturing is really the force that drives the economy."

Abstract talk about the wealth-creation aspect of manufacturing is one thing. But the illustrated table (see p. 23) showing what 100 new manufacturing jobs mean to a community makes the point clear. The data is from a 1984 study made by the U.S. Chamber of Commerce.

In the illustration, it is seen that 100 manufacturing jobs create 64 nonmanufacturing jobs and raise aggregate personal income by about $2 million. The second part of the table shows clearly how manufacturing supports various service industries.

In the study, the Chamber concluded: "In terms of net gains, the counties that experienced significant growth in manufacturing jobs were more prosperous, with increases in the number of businesses, retail sales and population, than the counties without significant growth in manufacturing."

The Big Question

Is manufacturing really letting go of its know-how?

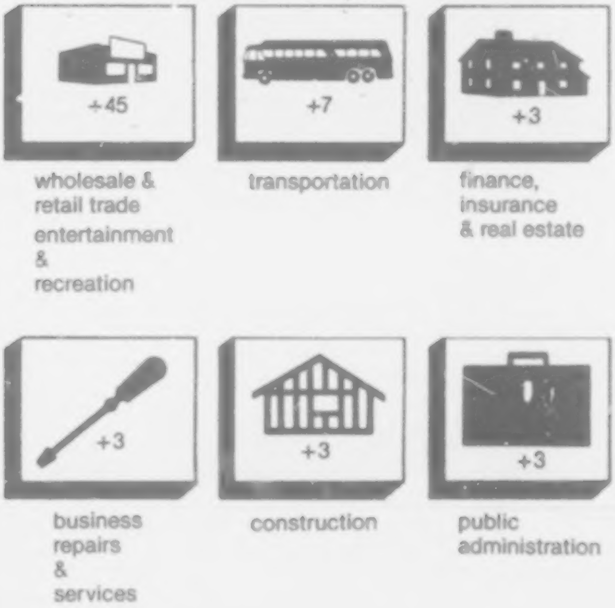
What 100 New Manufacturing Jobs Mean to a Community*

Aggregate personal income	$1,948,353
New retail establishments	7
Nonmanufacturing jobs	64
Population increase	202
Family units	102
School enrollment	61
Retail sales	$1,477,453

*Figures represent a net change from 1970 to 1980. Source: 1984 Study of the U.S. Chamber of Commerce, based on census data from 1970 and 1980.

Employment Changes Resulting from 100 Workers Added to Manufacturing Sector of a Community

100 New Manufacturing Jobs = 64 New Nonmanufacturing Jobs


+45
wholesale & retail trade
entertainment & recreation
+7
transportation
+3
finance, insurance & real estate
+3
business repairs & services
+3
construction
+3
public administration

Source: U.S. Chamber of Commerce

Or, is U.S. manufacturing meeting a challenge and actually strengthening itself—and the economy?

The argument centers on the high value-added content of manufactured goods that are being lost by U.S. producers. These are products that involve the most know-how.

The hard fact is that there are no precise numbers on the extent of de-manufacturing that has occurred. That is, no one knows for sure just how many companies have been involved, and no one knows just how much manufacturing know-how, if any, has already been lost.

Probably, the best measure of whether or not U.S. producers have so far held their own is seen in data on value added by U.S. manufacturers as a percentage of the overall economy.

The table with this article (see p. 27) shows that value added by U.S. manufacturers has indeed held its own. For example, it was earlier noted that the starting point of the so-called U.S. de-manufacturing trend was 1979-80.

Significantly, the average annual value-added figure since that time has shown no decline (23.8 pct in 1980; 23.9 pct in 1985).

So, after five years of a supposedly strong trend movement to de-manufacturing in this country—and the farming out of much value-added work—the actual value added by U.S. producers held rock-firm as a share of the overall economy.

It seems that most economists readily concede that U.S. manufacturing is undergoing great change. But not all see that change as seriously cutting down value-added content, or leading to serious loss of know-how by American manufacturers.

The Dollar's Role

"We are in a period of change in manufacturing in this country," said F. Gerard Adams, professor of economics and finance at the University of Pennsylvania's Wharton School. "There is no doubt about that.

"But the change is chiefly away

(Cont. on p. 27)

from production of mass-produced commodity-type goods into high-quality, trademark goods. These latter goods are of higher value-added."

In other words, Dr. Adams does not think that production of high value-added goods, or, manufacturing know-how is endangered. The changes that are occurring in manufacturing do not pose a long-term threat to those key elements.

"I think that as time goes on," he added, "you will see U.S. producers doing more as the Japanese are doing—sticking to high value-added manufacturing. The mass-produced commodity goods will be produced mostly by the Koreans, Mexicans, Brazilians and so on. They can produce these goods as well as we can. And, remember, we have long been good at high value-added production; we currently lead the world in such lines as computers and aircraft."

The Wharton economist also feels that a great deal of so-called de-manufacturing will end when the value of the dollar rachets lower. The strong dollar, more than anything else, he feels, has accounted for the bulk of the outsourcing, high imports and joint ventures that have been seen in U.S. manufacturing.

"A lot of the farming out of manufacturing that looked good when the yen was 240 to the dollar," he noted, "won't look nearly so good when the yen goes to 150 to the dollar, or quite possibly, to 120 to the dollar. There will be sharp adjustments made; it will take some time because many already-committed production agreements cover somewhat long periods of time."

Another View

There is still another point of view that says that de-manufacturing is not the main show in change that is taking place in U.S. manufacturing. This view holds that a shift in size and structure of manufacturing is what is happening.

This latter view was described, and even endorsed, by President Reagan in a major talk a year ago. "We have lived through the age of big industry," he said, "and the age of the giant corporation, but I believe that this is the age of the entrepreneur, the age of the individual."

Manufacturing Share of U.S. Economy — Value Added by Mfg. as Pct Share of Real GNP

1960	23.3%
1965	25.5
1970	24.1
1975	23.5
1980	23.8
1985	23.9

Source: U.S. Commerce Dept

The President added that it was from this smaller-scale entrepreneurial sector where "American prosperity is coming from now."

One top management consultant estimates that of the 40 million jobs added in the U.S. economy in the past 15 years, some 33-35 million were created by entrepreneurial operations. This took place as many large corporations were retrenching or pulling out of manufacturing.

Futurist John Naisbitt has said, "America's traditional bigger-is-better manufacturing philosophy is giving way to 'focused factories' that result in high productivity and improved labor relations."

Trade Weighted Value of Dollar Index vis-a-vis Currencies of 15 Major Countries

1985	Feb.	137.9
	April	131.9
	June.	129.4
	Aug.	124.6
	Oct.	117.2
	Dec.	114.8
1986	Jan.	113.7
	Oct.	111.5

Source: Morgan Stanley & Co.

Mr. Naisbitt noted that General Electric and a number of other industrial giants are now replacing huge manufacturing complexes with new, smaller plants—the focused factories. He cited as an example of focused factories, the mini-mills that held only 2.5 pct of the U.S. steel market in 1964 and now claim 20 pct of the market.

Too, while big-dollar corporate mergers have captured headlines, many more companies have been peeling off divisions and subsidiaries in an effort to become smaller, more manageable and stronger corporate entities.

Record numbers of corporate divestitures have been taking place. The merger broker firm, W. T. Grimm Co., reported 953 divestitures took place through the first three quarters of 1985—a number greater than for all of 1984.

Certainly, many manufacturers that make mass-production goods, have been trimming back operations. Producers of a variety of commodities and basic goods have trimmed operations and reduced or redeployed assets. That has been a visible restructuring that has been going on in the economy; it does not mean manufacturing know-how is being lost.

In short, at this time, it cannot be shown irrefutably that all U.S. industry is caught up in a massive de-manufacturing movement.

More likely, most recent actions by U.S. manufacturers have been designed either to cope with the passing effects of a highly over-valued dollar or strengthen themselves for the long run.

The shifting of production—from commodity-type to high value-added products—is going on. Focused factories are an example of a move towards a more productive and more competitive U.S. manufacturing sector. In addition, the great entrepreneurial surge taking place in this country belies any weaknesses among U.S. businessmen or the business process. ☐

ROBOTICS EXTENDS ITS REACH IN THE FACTORY

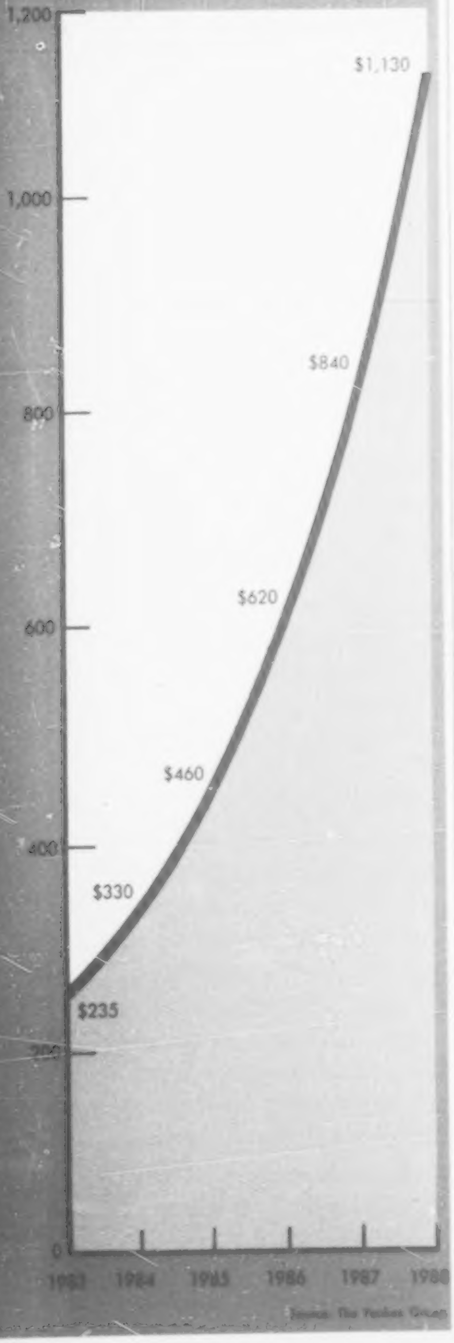
BY ROBERT E. HARVEY

While orchestrating robot development, robot builders often play variations on a central theme. Each year that theme changes.

In 1983 the echoing refrain was 'practicality.' That year at Robots 7 (a show sponsored by SME's Robotics International and the Robotic Industries Assn.) no-nonsense robots strained at real factory tasks. Earlier shows had robots rolling dice and playing tic-tac-toe.

(Cont. on p. 36.)

The Robotics Market Continues Its Upward Pace
(Sales in Millions of Dollars)



Source: The Yankee Group

Vendors the next year at Robots 8 continued singing the praises of usefulness but began to voice the need for robots to harmonize with other devices. When working in concert, the general purpose robot with the ability to perform a variety of roles became the recognized star.

By Robots 9, the general purpose robot had become a has-been. The rising star was the specialist: the assembly robot, the clean room robot, the arc welding robot, and the sealing robot, to name a few.

This year, when Robots 10 opens its doors April 21-24 in Chicago, the specialist will again be featured, but no longer in a staring role. Devices operating in concert will be highlighted, only this time the featured performer will not be a robot but a choir of specialized machines working in harmony.

Integrating robotic applications is not only the theme for Robots 10, it is also the central strategy of an increasing number of robot manufacturers. Many believe that the future belongs to those firms with the ability to supply complete manufacturing systems, not just robots. To better reflect their expanded role as systems integrators and suppliers, several firms, including GMF Robotics, considered updating their name. One firm, American Robot, is dropping 'Robot' from its title.

"Our recent transition from being a robot manufacturer only to become a leading manufacturer of a wide range of computer-integrated manufacturing (CIM) and flexible automation products has led to a new name for our company: American Cimplex Corp.," said Romesh Wadhwani, its chairman and CEO.

Paul Ockerman, president of Unimation, Inc., sees the need to widen his company's focus as well. "The future of Unimation depends on our continued ability to differentiate ourselves from the competition. We have done this in the past with our hardware and will do it in the future with our control technology and the ability to integrate our robots with sensors and other automation equipment as we move toward the factory of the future."

Three years ago, Unimation became part of Westinghouse. Currently, Unimation is part of Westinghouse's Advanced Production Technology Business Unit. Being part of this unit, which does systems and applications engineering, gives Unimation an entree into major systems business and technology.

Several developments have spurred this urge to shed the constraints of the basic robotics business and brave the perils of the integration and systems business. Most critically, the demand for the simple stand-alone robot is drying up. Jobs once needing this robot now require more complex equipment or fewer new robots.

"I think that the early simple applications are becoming saturated," said Richard H. Johnson, manager of product and market planning, GMF Robotics Corp, Troy, Mich. "The reason all applications have not yet become saturated is that some have higher barriers to entry."

At General Motors, for instance, applying sealant to automotive parts was a labor-intensive task. But robots could not be used until vision systems came along with three-dimensional offset capabilities, allowing them to apply sealant accurately.

"Three-dimensional vision is necessary because a car is simply not positioned accurately enough to permit automated sealing without 3-D vision," explained Mr. Johnson.

Automatic spot welding is an example of a task that once could be done by a simple robot but is now demanding a sophisticated system. "Rather than just moving the gun to the spot to be welded, the robotic system now is controlling the spot weld guns directly. It is monitoring every weld, and eventually the path (for) the gun will be passed to the robot from an off-line system," said Mr. Johnson.

Experience Curve

Their rising experience curve has paved the way for more robot vendors to move into systems development. Robot vendors over the past decade have learned well how to use robots effectively in manufacturing operations. This has not always been the case. Installed robots in the early years were difficult to use, difficult to integrate with other operations, difficult to communicate with, and difficult to program. The robots (the robot arms and grippers) haven't changed radically over the years. What has changed is the experience of robot manufacturers.

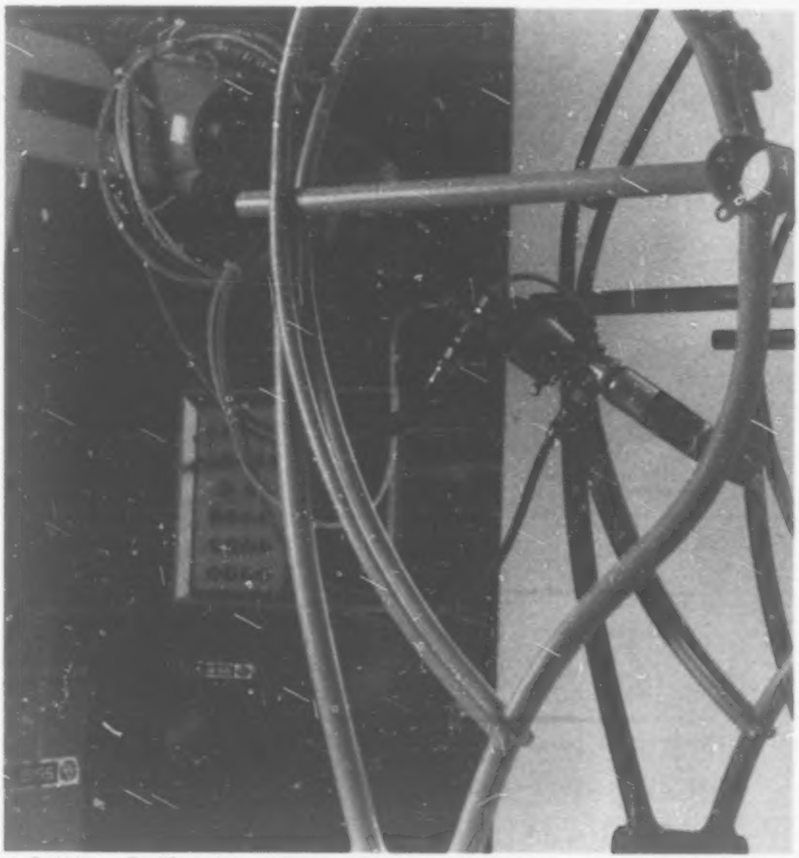
"The robot that Prab built in 1976 is much like the one being built in 1986," said Walter Weisel, president of Prab Robots Inc., Kalamazoo, Mich. "It is just that we have learned how to apply it to manufacturing operations."

Its diverse application experience has taught Prab that becoming a systems supplier—not just a robot supplier—was the wave of the future.

"At this point, there is a good case to be made that Prab is the leading robotics system supplier in the country. Most others woke up last year to the fact that they ought to get heavily into systems," said Mr. Weisel. "We woke to that fact in 1982 when we got shocked into the realization that GM was going into the robotic business, as was GE and Westinghouse."

A final development propelling the robot vendor into the systems business has been the growth of new technology, principally computer technology. Because robots are flexible creatures, they can be wedded to a variety of technologies. They are working with lasers and water jet cutters to do various metal cutting and metal processing jobs. Linked to vision systems, they can react to changes on the factory floor. Also, robots are being merged with machine tools and material handling equipment, as well as cell controllers, networks, and CAD/CAM equipment.

This evolution from a stand-alone robot to a robotic system went through three stages, said Mr. Johnson of GMF. "You might say that we started with task-oriented robots, are now using local cell-oriented robots, and are headed toward total-cell-oriented robots."


A DeVilbiss/Trallfa robot, using an electrostatic spray gun, coats bicycle frames.

Robots started out doing three basic tasks: spot welding, painting, and picking and placing. To do these tasks, the robot was jogged into position with a teach pendant. Once taught, the robot would repeat the path in a continuous cycle.

"At this basic level, the robot was mainly a tool to position an end effector," said Mr. Johnson. "The controller of a task-oriented robot evolved from the NC controller and it was primarily position-oriented."

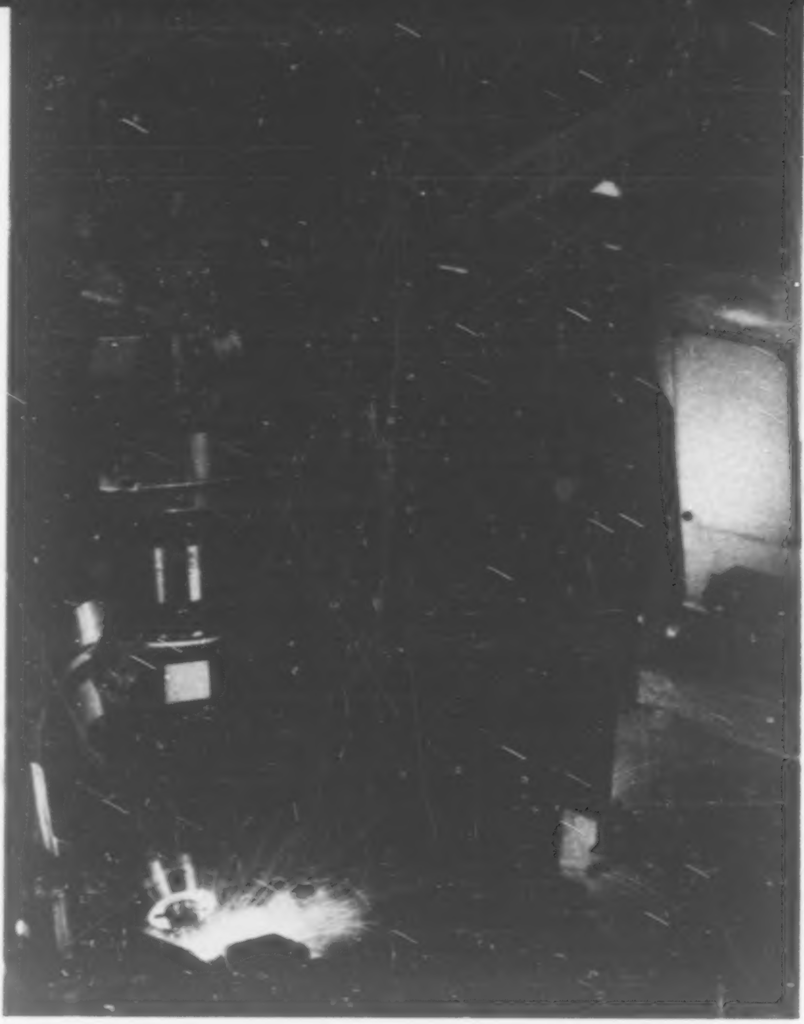
At stage two of its evolution (local cell orientation), the robot still is jogged into position with a teach pendant. Now though, the robot controls not only the positioning of the end effector but the process as well. In some spot welding applications, the robot positions the spot weld gun and controls its operation.

To do a variety of tasks, a robot needs more than a position-oriented control language. Higher level languages were developed that permitted such activities as multi-tasking (the ability to perform two tasks simultaneously).

"If you think of a language, it is based on two things—position data and logic. Higher level languages were needed to move the robot toward becoming a logic-oriented machine," said Mr. Johnson.

Today, robot manufacturers are moving from stage two toward stage three in this evolution. This stage is oriented toward total cell control. "At this level," explained Mr. Johnson, "vision becomes important as an option for the robot, as does the ability to teach (robot) path information directly from an off-line programming link to the user's database. That means you no longer have to use a teach pendant, for you are directly down-loading data from the user database."

With robots now involved in the total operation of manufacturing cells and systems, robot manufactur-



GMF Robotics has incorporated a vision system into this arc welding robot.

ers are spreading their focus beyond the individual robot to other elements that go into a flexible system.

As an example, vision systems and tactile sensing allow a robot to interact more effectively with its local environment. Robot manufacturers are using CAD/CAM systems off-line to program robots. Robots are being integrated with material handling equipment. GMF, for example, will soon be in the automated guided vehicle business.

New Languages

New computer languages are key to the movement of robots into systems. Several useful high-level robot languages exist today and provide ease of use, off-line programming and cell integration capabilities.

Unimation recently introduced its new high-level language: Val III. Val III is multi-tasking and has expanded mathematical functions for such tasks as the manipulation of transforms, vectors, and strings. It is an English-based language which eases a programmer's task.

While languages like Val III are improvements over past robot languages, the lack of a standardized language remains a major barrier to computer-integrated manufacturing (CIM). Each robot maker has its way of programming robots. Trying to get different robots to work together is a nightmare.

It is a little early yet to predict a winner, but one language nearer than others to becoming a factory standard is Karel from GMF. Karel has the inside track because companies outside of GMF are adopting it. Allen-Bradley, a large manufacturer of robot controllers, recently announced its commitment to Karel.

Allen-Bradley had been designing its next generation of robot controllers and considered inventing its own language. "We decided that what the world did not need was another robot language," said Jay Jeffery, engineering product manager in charge of the robot products at Allen-Bradley. "After considerable analysis we went with Karel."

Allen-Bradley went with Karel for a variety of reasons. For one, it was acceptable from a functional and performance standpoint. For another, it seemed like the best bet to evolve into a standard. It also helped that GMF was the largest robot supplier around and tightly connected to the auto industry, a major market for Allen-Bradley.

What swayed Allen-Bradley the most was GMF's decision to promote Karel as an open language. Past languages developed by robot manufacturers were proprietary, closed to enhancement by others.

Being able to buy robots from various vendors and program them with the same language will ease the robot user's job considerably.

A strong alternative to Karel is AML from IBM, which also bills itself as a general purpose language for plant floor automation. "Recent AML efforts are exploring portability, compilability, opening the system, providing linkages to other languages, and controlling a variety of robots and devices other than robots," said an IBM spokesman.

With a high level language, off-line programming, the ability to develop a program and transfer that program to a robot instantly, becomes a possibility.

Typically, teaching the robot a new program requires taking the robot out of production. If changes must be made to the workcell, then the robot must be re-taught. Off-line programming can eliminate or reduce most of these problems.

Several companies offer off-line programming capabilities today, but the technology is complex and not without its hazards.

"There is little difficulty today generating an off-line program for a robot; a number of firms offer the technology. But once you have the program, problems develop," explained Mr. Weisel of Prab. "The problem is not so much transmitting the program to the robot. You can do that with simple interfaces and a post processor that takes data generated from a CAD system and massages it into machine language. The real problem is that people make sloppy robots.

A sloppy robot may go were it is supposed to go, or it may not. If it goes where it is supposed to go today, it probably won't next week. Also, with sloppy robots, a program developed for one, would almost never run the same on another robot from the same manufacturer.

"In order to supply robot systems, we realized that robots with tight robot-to-robot tolerance were needed," said Mr. Weisel. "Prab couldn't make them so we bought them from a West German firm. But we decided that buying the technology was not enough."

Prab, therefore, bought the license from the West German firm to manufacture the robots and is starting up production.

Of the many robots systems now appearing in the U.S., an increasing number are coming from foreign firms or U.S. firms with foreign connections. Ever since the successful partnership of General Motors and Fanuc to form GMF, other U.S. firms increasingly are aligning themselves with foreign companies.

In March, Cincinnati Milacron, Inc., and Hitachi America, Ltd., a subsidiary of Hitachi Ltd., Japan, worked out such an agreement. Hichachi will supply the U.S. firm with a small industrial robot arm incorporating Cincinnati's specifications. Using controls and software supplied by Cincinnati, the new robot broadens Cincinnati's line of process robots for arc welding, sealant applications, and other uses.

Rather than linking up with U.S. firms, some foreign companies have set up their own plants in the U.S. to build robotic systems for the American market. ASEA Robotics, for example, makes robots in New Berlin, Wisc. And ESAB North America Inc., a subsidiary of ESAB AB of Sweden, primarily a welding company, makes robots for welding systems in Fort Collins, Colo. ESAB and ASEA have ties between them; ASEA owns nearly half of ESAB stock. In designing welding systems for large lot sizes, ESAB incorporates ASEA robots. But for systems calling for smaller runs, ESAB has developed its own.

Although it is a complete welding cell, ESAB concentrated on low costs and ease of use.

"For the system we developed the MAC (Mechanism Arc Center) which is a large robot that is programmed by using a lead-through teaching technique," explained John Farrell, vice president of ESAB's Robotic Welding Division. "Instead of sitting with a teach pendant or off-line programming system, you just move the weld gun, which is mounted on a robot, over the surface to be welded and just push a button where a weld is required. Since the robot is so easy to program, entering information like weld schedules is easy. The objective was to design a robot able to be programmed in a short time (10-20 pct of the automatic cycle time)."

Even without U.S. connections, foreign systems suppliers are receiving increasing numbers of orders from U.S. firms.

General Motors, for example, is paying reportedly $3 million for what may be the world's first simultaneous 5-axis, CNC carbon dioxide laser spatial robotic welding system for on-line automotive component production. The unit is being installed in GM's Linden plant, N.J. The supplier is Prima Industries S.p.A of Turin, Italy. Prima had to compete with Comau, Ferranti, and Cincinnati Milacron for the order.

Machine Vision

Another technology helping bring about robot integration is machine vision. While there is no disagreement about the potential of vision to improve factory productivity, there are doubts about the value of linking a robot with a vision system.

"I think you are going to see a lot of vision in the factory, but I think you are going to see very little of it with robots," stated Mr. Weisel. "The problem is you have vision companies that build stand-alone vision systems, and you have robot companies that build stand-alone robots. So you have an $80,000 robot trying to talk to a $40,000 to $100,000 vision system."

According to Mr. Weisel, the combination is too costly—unless that aspect of vision technology that is important to the robot is culled out and integrated with a robot in an inexpensive package.

If cost is the major obstacle, the price of vision in some cases is dropping dramatically. One vision system, soon to be introduced, will have a $25,000 price tag, less than half the price of last year's system.

"For vision to proliferate in robots it must be made cheaper," said Stanley N. Lapidus, president, Itran Corp., Manchester, N.H. "However, I believe that robots will undergo explosive growth when robust vision is built into them, but it has to be a fraction of the robot's price or you price yourself out of business."

As uses for robots become more systems-directed and more sophisticated, the need for intelligent robots becomes more critical. Robots with artificial intelligence, with the ability to respond to a wide variety of sensory cues and learn from experience, represent the future.

Vision and tactile sensing allow the robot to learn something about its environment. Decision-making enables the robot to determine its next action based on information it receives from its own senses, another machine, or an operator.

Robots that combine extensive communications ability (the ability to interact with other equipment) with repeatability, accuracy, and intelligence are the most advanced robots today—and they are rare.

Certainly, now is a period of transition from the stand-alone robot to integrated factory automation. Robot cells and systems are growing increasingly popular and the robot manufacturers are moving beyond robot production and sales into those technologies that will make the robot an integral part of the automated factory. ☐

PRICE & PRODUCTION DATA

(Effective March 31 1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	172	186	202	170
Pittsburgh	237	246	251	252
Youngstown	114	113	113	113
Lake Erie	157	150	163	150
Detroit	143	148	150	151
Chicago	513	498	521	543
Midwest	173	172	152	192
Southern	201	192	224	207
Western	84	81	92	100
U.S. Production	1,798	1,786	1,868	1,878

Source: American Iron & Steel Institute

Lake Superior Ore Prices

[illegible]

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi regular-unscreened	gross-ton $32.53
Mesabi non-bessemer	gross-ton $30.03-31.53

[illegible]

STEEL PRODUCTION, COMPOSITE PRICES

(Effective March 31 1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,798	1,786	22,307	21,056
Capability Utilization Rate	72.1	71.6	71.1	64.7

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 1/1/86)	24.607	24.607	24.607	27.582
Pig Iron** (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	$ 73.83	$ 73.50	$ 73.50	$ 81.83
No. 2 bundles	$ 54.50	$ 53.83	$ 52.83	$ 56.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 73.50	$ 73.50	$ 73.50	$ 83.50
No. 1 steel, Philadelphia	73.50	72.50	72.50	81.50
No. 1 steel, Chicago	74.50	74.50	74.50	80.50
No. 1 bundles, Detroit	62.50	65.50	65.50	76.50
Low Phos., Youngstown	73.50	73.50	73.50	73.50
No. 1 mach'y cast, Pgh	73.50	73.50	73.50	71.50
No. 1 mach'y cast, Phila	93.50	93.50	93.50	98.50
No. 1 mach'y cast, Chi	109.50	109.50	109.50	111.50

[illegible]

NONFERROUS PRICES

[illegible]

Primary Metal Prices

[illegible]	[illegible]	[illegible]	[illegible]
Aluminum SME	54.21	54.49	3-31-86
Copper (C)	73.50	73.50	
	73.00	73.00	3-28-86
Lead	18.25	18.00	
	18.00	18.00	3-20-86
Magnesium Ingot	153.00	148.00	10-9-85
Nickel LME	189.35	189.96	3-31-86
Zinc	35.00	35.00	11-8-85

[illegible]

Antimony, American (Laredo, Texas)	$2.[illegible]
Beryllium aluminum 5% Be per lb. contained Be	$2[illegible]6.00
Beryllium copper, per lb. cont. Be	$144.00
Beryllium 97% powder (00)	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium 99.5% electrol.	$4.62
Cobalt 99% cathode	$11.70
Gold per troy oz.	$338.10
Indium, dollars per troy oz.	$2.50
Iridium, dollars per troy oz.	$460.00
Magnesium sticks, 10,000 lbs.	$2.82
Mercury per 76-lb., f.o.b. N.Y.	$255.00-265.00
Molybdenum, lb. tech moly oxides, 20 lb. MO con.	$3.25
Palladium, per troy oz.	$113.00
Platinum per troy oz.	$424.00
Rhodium per troy oz.	$[illegible]
Silver ingots per troy oz.	$5.55
[illegible]	$[illegible]
[illegible]	$[illegible]
Vanadium	$[illegible]
Zirconium sponge	$12.00-17.00

[illegible]

Straits Tin Price

[illegible]

Mar. 24 N.Q.
Mar. 25 N.Q.
Mar. 26 N.Q.
Mar. 27 N.Q.
Mar. 28 N.Q.
N.Q. = Not Quoted

Scrap Prices
Brass Mill Scrap

[illegible]

	Solids	Turnings
Copper	66	65
Yellow brass	5[illegible]	48
Red brass	5[illegible]	42½
Comm. bronze	5[illegible]	5[illegible]
Mang. bronze	45	44
Free cutting rod ends	50	49

Custom Smelters Scrap

[illegible]

No. 1 copper wire	62
No. 2 copper wire	54
Light copper	45

Ingot Makers Scrap

[illegible]

No. 1 copper wire	58
No. 2 copper wire	50
Light copper	43
No. 1 composition	47
No. 1 comp. turnings	46
Hvy. yellow brass solids	31
Hvy. yellow brass turnings	27
Radiators	35

Aluminum

New mixed clips	42	— 43
Old sheet	40	— 41
Old cast	40	— 41
Clean dry turnings	40	— 41

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	31	— 33
Mixed clips	27	— 28
Old sheets and cast	24	— 25
Borings and turnings	21	— 22
Duraluminum clippings	25	— 26

Copper and Brass

No. 1 copper wire	49	— 50
No. 2 copper wire	40	— 41
Light copper	33	— 34
Radiators	31	— 32
No. 1 composition	39	— 41
No. 1 composition turnings	36	— 37
Cocks and faucets	29	— 30
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel anodes	110	— 120
Nickel rod ends	110	— 120
Nickel sheets, clips	110	— 120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 16
Old diecast zinc	11	— 12

EFFECTIVE MARCH 31, 1986

Ferrous Scrap Prices

Pittsburgh

Chicago

Philadelphia

Detroit

Youngstown

Cleveland

Buffalo

St. Louis

Birmingham

Cincinnati

New York

Boston

San Francisco

Los Angeles

Seattle

Hamilton, Ont.

Houston

Four changes have been made in products listed on the table. The new product listings are Oil and Gas Field Machinery, Mining Machinery & Equipment, Foundry & Forge Shop Products and Internal Combustion Engines. These replace the previously-listed Industrial Process Furnace & Ovens, Fluid Power Equipment, Cutting Tools & Accessories and Miscellaneous Metal Products. The changes are due to changes in reports by the U.S. Labor Dept.

NOW, THE QUESTION IS, WHERE'S THE BOTTOM?

In February, for the fifth time in the last nine months, producer prices fell. Prices not only declined, but the size of the drop was the largest since the U.S. Labor Dept. started calculating its price index in 1947.

Collapsing oil prices led in the price drop during the month. But prices were down across a broad front. Prices of metalworking products on the accompanying table were right in line with the price-softness trend. The average came out to zero price change.

As of February, the Labor Dept.'s over-the-year price index for all finished goods was down 0.1 pct. During the same period, prices of finished energy goods fell by 8 pct. These goods remain under considerable downside price pressures.

Prices of capital equipment were about the only increases in February. This rise, a modest 0.1 pct, came about when price increases for printing trades machinery, food products equipment and service industry machinery more than offset lower prices for trucks.

Since the double-digit price-rise days of 1979-80, some economists have said that if inflation could be brought under control, the economy would break loose in a great wave of prosperity.

Now, with prices actually disinflating, the economy is still not showing any signs of runaway growth. Growth last year came to a substandard 2.2 pct—when producer prices rose by less than 2 pct. Some industries haven't even shared in the modest economic growth that has occurred.

The explanation is apparent to many companies in basic goods lines. Imports have skimmed the cream in many markets. At the same time, the foreign competition has put on a tight lid that is now holding down prices.

Latest Month Covered: February 1986

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	397.0	0	+ 1.6
Metal Forming Machine Tools	438.3	0	+ 1.6
Agricultural Machinery & Equip.	338.1	— 0.1	— 0.1
Construction Machinery & Equip.	365.4	+ 0.1	+ 0.6
Oil and Gas Field Machinery	424.1	— 0.2	— 0.8
Industrial Material Handling Equip.	295.3	— 0.1	+ 0.7
Pumps, Compressors & Allied Equip.	357.2	0	+ 0.9
Mining Machinery & Equipment	382.4	0	+ 1.4
Mechanical Power Transmission Equip.	341.0	+ 0.3	+ 1.9
Automobiles	229.6	— 0.2	+ 1.1
Motor Trucks—Light	306.0	— 0.8	+ 3.3
Motor Trucks—Heavy	340.2	— 1.4	+ 2.1
Railroad Equipment	364.9	+ 0.1	+ 0.9
Fabricated Metal Structural Products	315.8	+ 0.2	+ 0.7
Electric Motors	349.6	0	— 0.1
Valves & Fittings (Dec. 1982 = 100)	106.2	+ 0.1	+ 2.1
Ball & Roller Bearings	353.5	0	+ 2.2
Foundry & Forge Shop Products	365.2	+ 0.4	+ 0.7
Heating Equipment	264.9	+ 0.1	+ 3.0
Plumbing Fixtures & Brass Fittings	316.0	+ 0.4	+ 3.0
Metal Containers	361.2	0	+ 0.9
Internal Combustion Engines	348.9	+ 0.2	+ 2.7

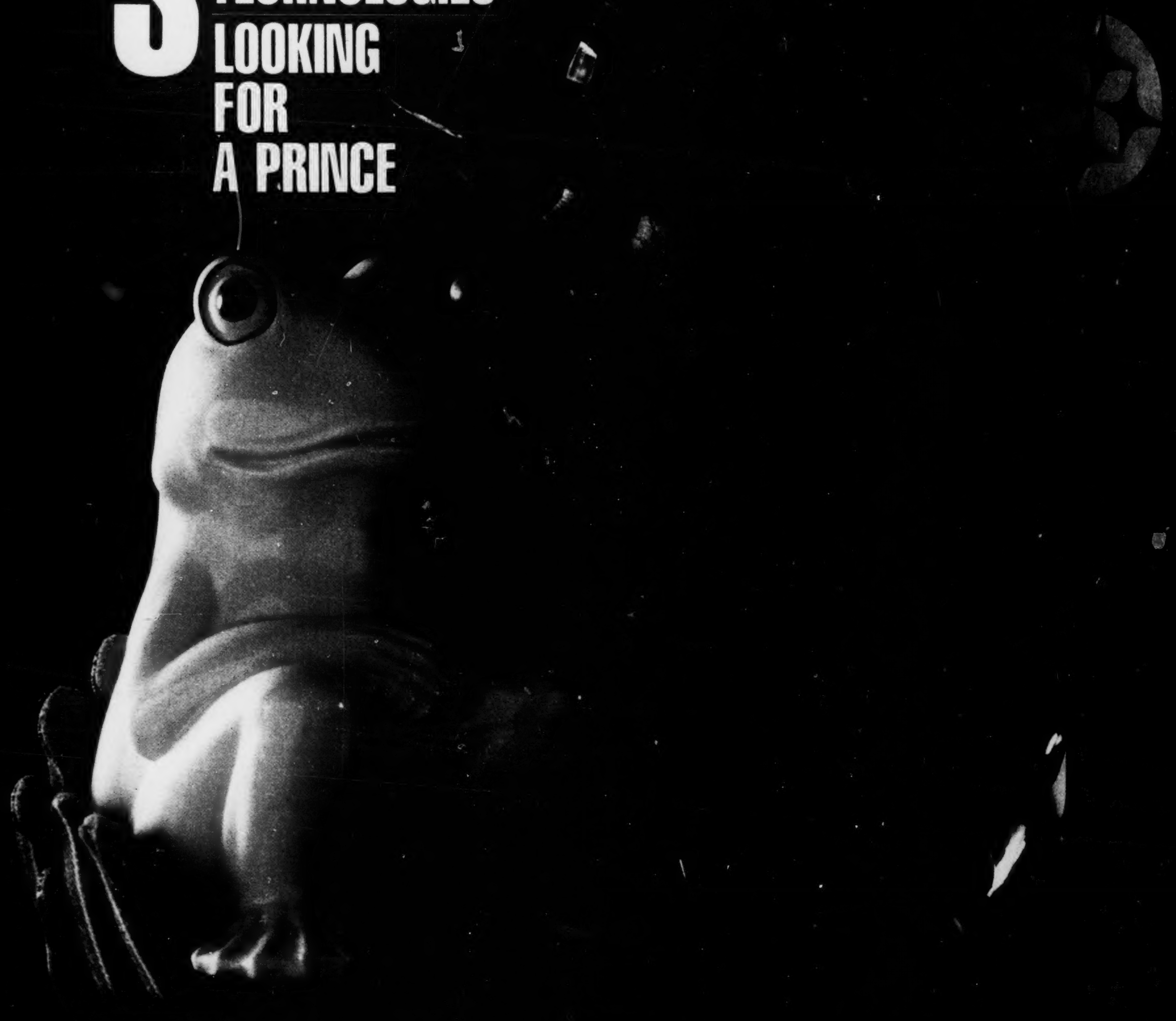
Data based on U.S. Labor Dept.'s Producer Price Index

C2150-8

IRON AGE
MAY 2, 1986

MANUFACTURING MANAGEMENT

STEEL'S LEAPFROG TECHNOLOGIES SLOOKING FOR A PRINCE



CK014CONGRESSI0N00
OCT86
CONGRESSIONAL INFO SERV / DIR
SRI ACQUISITIONS
4520 EAST WEST HWY
BETHESDA MD 20814

ANNUAL STEEL/NONFERROUS FINANCIAL ANALYSIS: THE WINNERS AND LOSERS

TITANIUM MOVES BEYOND AEROSPACE

MAY 2, 1986 VOL. 229, NO. 9

IRON AGE
MANUFACTURING MANAGEMENT

Editorial 5
Oliver Twist had the right idea.

Newswatch 13
The White House will support Federal product liability legislation.

Steel/Nonferrous Financial Analysis 19
The business recovery continued to elude the metals producers.

You and Your Job 28
Government contracts bring big payoffs to small firms.

Steel's Leapfrog Technologies 32
The quest has begun for a more efficient melting process.

Titanium 49
It looks like this unusual metal is finally going places.

Ellwood City Forge 57
If you can't buy steel, this forger decided, make it.

Supermagnet 65
Energy Conversion Devices puts a lot of stock in this one.

Technically Speaking 66
Inertia welding produces dissimilar metal parts.

Materials Report 78
Rising steel imports and falling auto production worry steelmakers.

Order Trends 90
Still no sign of a takeoff for orders.

Next Issue: America's Superplants—Honda and Nissan.

Departments

EDITORIAL STAFF **6**
LETTERS **8**
INDUSTRIAL BRIEFS **26**
PRODUCT & EQUIPMENT REVIEW **67**
FREE LITERATURE **76**
AD INDEX **80**
BUSINESS STAFF **80**
MANAGEMENT SERVICE CARD **81**
P&P DATA 4/14 **84**
FERROUS SCRAP 4/14 **87**
CLEARING HOUSE **88**

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year, $85 Canada/Foreign (24 issues); Metalsproducer edition—$30 one year; $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 3026, Wheaton, IL 60189.

Chilton

ONE OF THE ABC PUBLISHING COMPANIES

ANNUAL STEEL/NONFERROUS FINANCIAL ANALYSIS

There was little joy among the steel producers and the nonferrous industries last year. The business recovery that others enjoyed eluded them.

BY MICHAEL MARLEY
AND ROBERT REGAN

STEEL

It was another year that many in the domestic steel industry would just as well forget. While some of the industry's best customers enjoyed another year of economic recovery, many of the nation's steelmakers continue their trek through the dark tunnel of recession.

Little or no gain in demand, a steady flood of imports and low prices are the trio of culprits that seem to be plaguing the industry's balance sheets. if the industry ever sees from relief from these burdens, it might turn a healthy profit.

Steel shipments slipped to an estimated 72.7 million tons, off 1 million tons from the previous year. Sales for the 19 steel producing companies included in this year's *Iron Age Financial Analysis* fell an estimated $150 million from the their totals for 1984.

Imports accounted for an estimated 24 pct of the domestic market last year, far above the 18.5 pct figure set by President Reagan voluntary restraint program.

And while many of the domestic steelmakers continue to bring down their labor costs, their efforts went unrewarded. Prices were falling faster than costs.

One healthy omen for this year was the sheet prices increases Jan 1. The new levels held and further increases are scheduled this month.

Nevertheless, the consequences of last year's problems had a predictable impact on the industry balance sheets. Operating profits were down more than $500 million for the companies included in this year survey and net income dipped even deeper into the red—from to an overall loss of $250 million in 1984 to $887 million last year.

There were some companies hard pressed last year. LTV Corp. saw its net income fall to a loss of $724 million last year from a loss of $378 million in 1984. At Wheeling-Pittsburgh Steel Corp., which was hit with a three-month strike by the United Steelworkers of America, the bottom line went from a loss of $59 million in 1984 to a whopping $303 million in the red in 1985.

Perhaps, the most startling figure in this year's Analysis is capital expenditures column. The companies surveyed posted a 18.3 pct increase in their outlays in 1985—an indication that they are hardly ready to throw in the towel.

NONFERROUS

The nonferrous metals companies spent most of 1985 outside the charmed circle of industries enjoying the 1984-85 business recovery. It was another year of absent or declining profits and it also was a year in which plants and businesses were shuttered and big writeoffs taken.

There weren't many gainers in the profits column and companies that made it, like Phelps Dodge Corp. and Inco, Ltd., for instance, showed modest profits against red ink in 1984. Only a third of the leading nonferrous companies on the list showed an increase in sales.

The U.S. dollar remained strong against most other currencies last year, which meant the domestic nonferrous companies had to withstand another year of stiff competition from imports, not only on the primary metal level, but on the mill product level as well. Import volume overall was a bit short of the 1984 level for both aluminum and copper, but 1984 was a busy year for foreign suppliers in the U.S. market.

The softening of the dollar came too late to do the American companies much good in 1985, but the aluminum companies, at least, have seen some easing of pressure on prices more recently and their incoming orders were up sharply in the opening months of the year.

For the copper companies, the benefits of a weaker dollar were confined to modest price improvement during the first quarter that showed signs of running out of steam as the second quarter began. Import volume, which was down in 1985, was showing signs of revival as 1986 progressed and there were no significant decreases in overseas output. The alarm in high places over the steep decline of oil prices on a free market wasn't expected to spill over into the nonferrous metals area, leaving it to the weaker dollar and chances of pickups in metals consumption overseas to take the pressure off the U.S. producers and their contracting domestic smelter base.

Lower oil prices are easing cost pressures on the domestic companies to varying degrees, but large parts of the copper and aluminum industries have to renegotiate wage contracts this Spring. There has been some hedge buying against risk of a strike in the aluminum industry, which has a long record of labor peace, but there has been little sign of it in the copper industry. ☐

Additional copies of the 1985 Steel/Nonferrous Metals Industries Financial Analysis may be obtained by writing Iron Age Readers Service Department, Chilton Way, Radnor, Pa., 19089. Copies are $2 each. Enclose check or money order with your request.

IRON AGE STEEL INDUSTRY FINANCIAL ANALYSIS

Company[1]	Year	Raw Steel Production Thousands of Net Tons	Steel Shipments Thousands of Net Tons	Net Sales & Operating Revenues 000 of $	Employment Costs 000 of $	Employment Costs as Percent of Sales	Operating Profit[2] 000 of $	Operating Profit as Percent of Sales	Depreciation Depletion and Amortization 000 of $	Provision for Federal Income Taxes 000 of $	Net Income 000 of $	Net Income Percent of Sales	Invested Capital (includes funded debt payable after one year, preferred and common stock and surplus) 000 of $	Net Income Percent of Investment[3]	Working Capital 000 of $	Funded debt (Payable after one year) 000 of $	Interest Expense on Funded debt 000 of $	Capital Expenditures 000 of $	Stockholders' Equity[4] 000 of $	Pct Return on Stockholders' Equity	Number of Common Shares Outstanding in Thousands	Common Stock 000 of $	Common Dividend Declared 000 of $	Earnings Per Common Share	Dividends Per Common Share	Price Range Common Share	P/E Ratio	
1. United States Steel Corp.[5,6,7,8]	1985	16,700	12,900	19,283,000	3,187,000	16.5	2,893,000	15.0	1,294,000	484,000	409,000	2.1	13,034,000	9.6	380,000	5,348,000	841,000	1,184,000	6,555,000	6.2	123,399	123,000	123,000	2.56	1.00	33-22⅜	13-10	1.
	1984	15,100	12,100	19,104,000	3,320,000	17.4	3,287,000	17.2	1,241,000	566,000	493,000	2.6	13,497,000	11.2	541,000	6,261,000	1,019,000	947,000	5,972,000	8.3	107,193	107,000	106,000	3.52	1.00	33¼-22	9-6	
2. LTV Corp.[9,10,11,12]	1985	13,112	10,675	8,198,000	2,639,300	32.2	176,400	2.2	247,200	1,800	(723,900)	(8.8)	2,914,700	(13.9)	185,300	2,146,400	318,900	170,400	652,200	(71.7)	88,559	597,800	—	(8.94)	—	13¼-5¼	—	2.
	1984	9,971	8,265	7,046,100	2,176,000	30.9	39,000	0.6	194,000	(27,400)	(378,200)	(5.4)	3,728,800	(3.4)	576,500	2,226,900	250,600	205,500	1,366,000	(30.2)	83,186	821,462	12,180	(5.84)	.1875	19⅞-8⅞	—	
3. Bethlehem Steel Corp.[13]	1985	10,440	8,792	5,117,700	1,900,000	37.1	328,500	6.4	282,700	22,000	(196,000)	(3.8)	2,661,800	(3.4)	126,800	1,650,500	106,400	322,200	1,011,300	(21.0)	51,981	653,500	14,500	(4.37)	.30	21⅛-12½	—	3.
	1984	12,166	8,925	5,392,100	2,169,900	40.2	288,600	5.4	282,600	18,000	(112,500)	(2.1)	2,422,300	—	147,300	1,265,300	111,700	309,000	1,157,100	(12.4)	46,544	566,200	27,900	(2.91)	.60	29½-14½	—	
4. Inland Steel Co.[14]	1985	6,069	4,703	2,999,422	988,501	33.0	31,312	1.0	119,663	(162)	(178,378)	(5.9)	1,880,528	—	267,971	922,100	64,939	174,790	958,428	—	25,266	358,516	9,473	(7.37)	.375	26-19½	—	4.
	1984	6,479	4,994	3,134,991	1,006,690	32.1	150,262	4.8	124,513	6,123	(41,366)	1.3	1,981,492	1.1	339,523	834,324	62,254	185,104	1,147,168	—	25,054	351,572	12,533	(1.97)	.50	32¾-19⅞	—	
5. Armco Inc.[15,16]	1985	5,347	4,373	3,732,700	1,155,600	31.0	143,200	3.8	152,000	4,600	55,000	1.5	1,733,600	8.2	361,000	640,100	87,800	102,200	1,093,500	5.3	68,036	340,200	—	.69	—	11⅝-6¾	17-10	5.
	1984	5,911	4,556	4,042,600	1,296,600	32.1	86,500	2.1	155,900	4,700	(295,000)	(6.5)	1,744,000	(11.5)	308,000	744,600	95,000	133,300	999,400	(25.8)	67,048	335,300	13,300	(4.55)	.20	23⅜-9	—	
6. National Steel Corp.	1985	4,785	4,409	2,082,311	—	—	50,915	2.4	97,508	200	(88,436)	(4.2)	977,321	(4.9)	48,675	386,573	40,417	262,303	590,748	15.0	—	—	—	—	—	—	—	6.
	1984	4,812	4,524	2,293,145	—	—	180,426	7.9	96,610	937	20,839	0.9	1,104,380	7.2	161,435	425,196	58,582	75,512	679,184	3.1	—	—	—	—	—	—	—	
7. Weirton Steel Corp.[17,18,19]	1985	2,744	2,357	1,156,301	332,785	28.8	87,238	7.5	8,147	—	61,035	5.3	291,078	27.2	200,864	189,766	18,057	47,523	101,312	60.2	6,524	—	—	—	—	—	—	7.
	1984	2,795	2,108	1,075,125	310,198	28.9	83,497	7.8	2,832	—	60,622	5.6	239,295	33.7	179,856	178,673	20,043	37,515	60,622	—	6,500	—	—	—	—	—	—	
8. Nucor Corp.	1985	1,893	1,710	758,495	165,325	21.8	145,671	19.2	31,106	47,700	58,478	7.7	397,736	15.7	213,513	40,234	3,889	29,066	357,502	17.2	14,231	29,685	5,697	4.11	.40	55¾-31	13.6-7.5	8.
	1984	1,725	1,518	660,260	142,895	21.6	114,977	17.4	28,899	34,000	44,548	6.7	342,835	14.2	152,920	43,232	4,222	26,075	299,603	16.0	14,113	24,567	5,082	3.16	.36	44¼-26	14.0-8.2	
9. Wheeling-Pittsburgh Steel Corp.[20,21]	1985	1,754	1,526	688,171	284,389	41.3	(95,337)	(13.9)	45,209	0	(303,072)	(44.0)	—	—	195,697	0	21,361	34,199	50,468	(600.5)	5,115	51,146	0	(60.87)	—	17⅞-7¼	—	9.
	1984	2,804	2,320	1,057,151	360,858	34.1	48,475	4.6	48,279	(2,208)	(59,376)	(5.6	) 882,564	0.2	124,968	527,291	61,330	26,878	355,273	(16.7)	5,109	51,090	0	(14.12)	—	35¼-13⅝	—	
10. Florida Steel Corp.[22]	1985	1,013	889	287,985	64,861	22.5	27,009	9.4	9,270	4,340	7,741	2.7	148,184	9.0	54,248	52,700	5,658	17,253	95,484	8.1	5,986	9,241	2,389	1.30	.40	11⅝-11⅜	—	10.
	1984	1,010	919	286,108	61,545	21.5	26,621	9.3	9,167	4,363	6,662	2.3	141,356	9.3	50,086	51,545	6,430	11,473	89,811	7.4	5,975	8,920	2,386	1.12	.40	25⅜-13	—	
11. Northwestern Steel & Wire Co.	1985	866	750	260,813	88,400	33.9	(19,123)	(7.3)	15,941	0	(40,846)	(15.7)	173,526	(23.5)	37,914	21,605	5,782	4,138	151,921	(26.9)	7,506	37,532	—	(5.44)	—	16⅝-8	(3)-(1)	11.
	1984	744	541	205,164	86,070	42.0	(30,231)	(14.7)	15,254	(14,229)	(34,296)	(16.7)	236,767	(14.5)	83,321	44,000	3,040	14,470	192,767	(17.8)	7,506	37,532	—	(4.57)	—	25⅞-14½	(6)-(3)	
13. Laclede Steel Co.	1985	757	552	226,066	80,116	35.4	14,742	6.5	3,864	4,090	4,800	2.1	113,143	5.9	65,769	31,795	1,988	6,154	81,348	5.9	2,704	54,329	676	1.77	.25	22-15	12-8	12.
	1984	721	494	228,924	77,483	33.8	17,236	7.5	3,590	4,497	7,409	3.2	101,520	9.0	56,750	24,295	1,740	5,517	77,225	9.6	2,704	54,329	—	2.74	—	17-13	6-5	
13. Cyclops Corp.[23]	1985	628	863	1,385,718	302,140	21.8	72,276	5.2	17,496	21,734	26,228	1.9	263,323	11.8	147,655	46,878	8,584	23,067	216,445	13.5	4,201	4,201	4,258	6.66	1.10	60¾-38¾	8.4	13.
	1984	587	869	1,271,593	298,771	23.5	57,438	4.5	17,731	11,528	18,434	1.4	292,611	8.2	171,141	98,843	9,745	24,878	193,768	10.7	4,098	4,098	4,116	4.82	1.10	39⅜-27½	8.1	
14. CF&I Steel Corp.[24,25,26]	1985	606	472	253,292	94,924	37.5	9,334	3.7	14,337	(3,700)	(3,447)	(1.4)	104,486	(1.2)	36,663	26,164	2,144	4,368	78,322	(4.4)	3,966	19,829	—	(.87)	—	16½-6⅝	—	14.
	1984	770	581	325,252	105,826	32.5	24,777	7.6	14,759	(13,399)	(28,146)	(8.7)	105,288	(25.1)	27,460	23,519	1,691	7,580	81,769	(34.4)	3,966	19,829	—	(7.10)	—	30-13	—	
15. Lukens Inc.[27]	1985	476	—	422,480	—	—	20,180	4.8	20,743	(5,326)	(4,189)	(1.0)	202,603	2.4	43,916	87,413	8,952	19,545	115,190	3.3	4,911	3,180	2,450	(.82)	.48	16-11¼	—	15.
	1984	483	—	416,384	—	—	38,214	9.2	19,343	3,780	4,701	1.1	195,643	7.7	40,118	69,798	10,390	17,086	125,845	3.8	5,165	3,180	2,066	.91	.40	16⅜-10⅛	18-11.1	
16. Copperweld Corp.	1985	320	422	354,049	116,900	33.0	6,272	1.8	15,202	(8,154)	(8,196)	(2.3)	216,139	0.2	58,338	82,022	8,679	14,923	134,117	(6.1)	8,610	7,175	1,896	(2.90)	.22	15¾-8⅜	—	16.
	1984	491	514	442,447	140,100	31.7	26,054	5.9	17,295	930	2,651	0.6	248,475	4.6	70,597	87,447	8,775	16,900	161,028	1.6	8,611	7,176	5,044	.24	.58	23¼-11⅝	—	
17. Carpenter Technology Corp.[28]	1985	—	—	556,735	219,908	39.5	65,394	11.7	18,589	14,000	24,512	4.4	444,875	7.4	158,060	125,637	8,293	70,138	319,238	7.7	8,906	45,698	18,613	2.77	2.10	48-35⅞	13.4	17.
	1984	—	—	528,824	204,643	38.7	76,148	14.4	16,995	21,379	33,441	6.3	433,447	8.7	176,514	126,239	4,333	49,024	307,208	10.9	8,752	44,925	18,289	3.84	2.10	58¼-42	11.0	
18. Quanex Corp.	1985	—	—	296,974	—	—	—	—	15,625	(5,801)	10,121	3.4	223,590	—	35,201	112,883	—	25,302	110,707	10.2	12,256	61,281	—	.89	—	10½-5	12-6	18.
	1984	—	—	398,314	—	—	—	—	23,212	(2,700)	1,979	0.5	214,738	—	36,847	127,349	—	32,443	87,389	2.3	10,658	53,289	—	.19	—	12½-6⅜	—	
19. Athlone Industries Inc.[29]	1985	—	—	217,265	—	—	23,001	10.6	3,953	2,523	2,707	1.2	115,242	15.6	36,581	99,686	15,245	4,396	15,555	17.4	2,374	232	3,743	.91	1.60	23⅜-18¼	23.35	19.
	1984	—	—	218,016	—	—	24,002	11.0	4,063	3,517	5,109	2.3	153,659	11.8	60,527	99,007	12,021	1,842	54,651	11.1	2,399	240	3,831	1.76	1.60	28¾-18⅜	7.6	
GRAND TOTAL	1985	[30]	[30]	48,277,477	11,620,149	[31]	3,979,984	8.3	2,412,553	594,496	(886,842)	—	25,895,874	—	2,654,165	12,010,456	1,568,088	2,515,965	12,688,785	—	—	—	—	—	—	—	—	
	1984	[30]	[30]	48,126,498	11,757,579	[31]	4,538,996	9.5	2,316,042	646,616	(249,489)	—	28,066,170	—	3,304,863	13,258,558	1,740,896	2,127,097	13,407,811	—	—	—	—	—	—	—	—	
Percent Change 1984 to	1985			0.4	(0.1)		(12.4)		4.2	(8.1	—	—	(7.8)	—	(19.7)	(9.5)	(10.0)	18.3	(5.4)	—	—	—	—	—	—	—	—	

Footnotes

Parenthesis ( ) denotes loss or credit

1. Companies are ranked on the basis of raw steel produced in 1984.
2. Operating profit is income before depreciation, income taxes and interest on long-term debt.
3. Net income percent of investment is net income plus expense on funded debt divided by invested capital.
4. Stockholders' equity is total assets minus total liabilities.
5. USS—Data reported is before the Feb. 11, 1986 merger of a subsidiary of U.S. Steel with Texas Oil & Gas Corp.
6. USS—Invested capital includes long-term debt, notes payable, proceeds from production agreements, minority interest, preferred stock of consolidated subsidiary, preferred stock subject to mandatory redemption, and other preferred stock and common stockholders equity.
7. USS—Stockholders' equity includes preferred stock subject to mandatory redemption.
8. USS—In the fourth quarter of 1985, the corporation's board of directors approved the valuation of common stock at the par value of $1 per share rather than the stated value of $20. As a result, common stock for 1984 has been restated.
9. LTV—Information in 1984 includes data of the former Republic Steel Corp. from July 1, 1984, the effective date of LTV's acquisition of Republic Steel for accounting purposes.
10. LTV—Operating profit for 1985 excludes special charge of $380,000,000 for rationalization and writedown of facilities.
11. LTV—Invested capital consists of long-term debt, all equity accounts, and deferred income and taxes.
12. LTV—Total value of common stock is determined by year-end market price ($6.75—1985; $9.875—1984) times outstanding shares of stock at year-end.
13. Bethlehem—Invested capital and funded debt includes caster financing obligations of $418,100,000.
14. Inland—1984 results of operations have been restated to reflect the announced discontinuance of Inryco, Inc., the company's construction products business segment.
15. Armco—1984 results of operations have been restated to reflect discontinued operations.
16. Armco—Operating profit includes special charges of $170,000,000 in 1985 and $205,000,000 in 1984. Both years exclude discontinued operations.
17. Weirton—Net income represents income after taxes, before provisions for profit sharing ($20,300,000 in 1985) and the contribution to the Employee Stock Ownership Trust.
18. Weirton—Percent return on shareholders equity is calculated on income after taxes, before provisions for profit sharing and contribution to ESOT. No 1984 return on equity was calculated due to formation of new company in 1984.
19. Weirton—Weirton Steel Corp. is owned by its employees through an ESOT. All shares issued are held and voted by the ESOT.
20. Wheeling-Pittsburgh—Net income for 1985 includes $141,200,000 loss for unusual items relating to the closing of certain facilities, mine closings, investment reserves and expected excise tax.
21. Wheeling Pittsburgh—Funded debt for 1985 included in pre-petition liabilities due to filing a petition seeking reorganization under Chapter 11 on April 16, 1985.
22. Florida Steel—Fiscal year ends Sept. 30.
23. Cyclops Corp.—Net income and earnings per common share in 1985 includes an extraordinary gain of $1,766,000 less applicable taxes of $1,262,000.
24. CF&I—Operating profit for 1984 does not include $74,831,000 write-off of tube mill nor the benefit (amounting to $24,959,000 net of taxes) of the cumulative effect on prior years of changing to straight-line depreciation.
25. CF&I—Provision for Federal income taxes in 1984 does not include $21,261,000 netted in cumulative effect on prior years of changing to straight-line depreciation.
26. CF&I—Net income for 1984 includes $74,831,000 write-off of tube mill and the benefit (amounting to $24,959,000 net of taxes) of the cumulative effect on prior years of changing to straight-line depreciation.
27. Lukens—Operating profit in 1985 includes asset writedowns and other charges totaling $6,654,000, which increased the net loss by $3,593,000 or $.70 per share.
28. Carpenter Technology—Fiscal year ends June 30.
29. Athlone—1984 results of operations have been restated to reflect discontinued operations.
30. Domestic raw steel production in 1985, as reported by the American Iron and Steel Institute, totaled an estimated 87,346,438 net tons, while shipments for the industry were an estimated 72,698,305 net tons. In 1984, according to the AISI, the industry produced 92,528,000 net tons and shipped 73,739,000 net tons.
31. No overall employment costs as a percent of sales has been determined because four of the companies listed have not disclosed this data.

IRON AGE NONFERROUS FINANCIAL ANALYSIS

Company	Year	Net Sales and Operating Revenues 000 of $	Operating Profit 000 of $	Operating Profit as Percent of Sales	U.S. and Foreign Income Taxes 000 of $	Extraordinary Income (Loss) 000 of $	Net Earnings 000 of $	Net Earnings as Percent of Sales	Net Earnings per Common Share	Dividends Per Common Share	Number Common Shares Outstanding at Year End	Stockholders Equity 000 of $	Net Earnings as Percent of Stockholders Equity	Funded and Other Long Term Debt 000 of $	Invested Capital 000 of $	Long term Debt as Pct of Invested Capital	Net Earnings as Percent of Invested Capital	Working Capital 000 of $	Capital Spending 000 of $	Retained Earnings At End of Year 000 of $	
1. Alcan Aluminium, Ltd.	1985	5,718,000	155,000	2.7	(87,000)	(416,000)	180,000	—	—	1.10	99,780,000	2,746,000	—	1,600,000	4,346,000	36.8	—	1,452,000	597,000	1,813,000	1.
	1984	5,467,000	388,000	7.1	151,000	—	253,000	4.6	2.59	1.20	99,118,000	2,916,000	8.9	1,350,000	4,266,000	31.6	5.9	1,488,000	427,000	2,103,000	
2. Aluminum Co. of America	1985	5,162,688	21,367	0.4	(94,900)	—	16,607	—	—	1.20	81,372,239	3,307,918	—	1,606,095	4,914,013	32.7	—	876,500	538,314	2,764,598	2.
	1984	5,750,835	515,815	9.0	150,100	—	256,048	4.5	3.13	1.20	81,140,879	3,343,592	7.7	1,634,893	4,978,485	32.8	5.1	985,933	593,672	2,881,160	
3. Alumax Inc.	1985	1,887,072	111,021	5.9	22,655	—	62,876	3.3	—	—	—	786,301	8.2	385,139	1,171,440	32.9	5.4	467,792	211,211	582,289	3.
	1984	1,973,600	235,300	11.9	69,400	—	126,000	6.4	—	—	—	737,534	18.0	453,674	1,211,208	39.1	10.4	589,733	116,576	536,483	
4. AMAX Inc.	1985	1,788,900	(47,000)	—	6,200	—	(621,000)	—	—	.10	68,507,000	888,400	—	1,075,900	1,964,300	54.8	—	299,300	143,000	(411,400)	4.
	1984	2,107,600	167,600	8.0	30,900	—	(238,300)	—	—	.20	68,602,000	1,610,300	—	982,000	2,592,300	37.9	—	340,300	131,000	211,600	
5. Asarco Inc.	1985	1,166,921	(40,233)	—	2,261	—	(62,184)	—	—	—	32,046,843	649,479	—	435,490	1,224,969	35.6	—	98,599	25,768	438,473	5.
	1984	1,325,129	14,791	1.1	(3,566)	—	(306,080)	—	—	.30	28,374,736	692,588	—	541,105	1,373,693	39.4	—	139,600	34,570	519,377	
6. Brush Wellman Inc.	1985	242,902	48,761	20.1	20,248	(10,025)	17,887	7.4	0.95	.51	20,900,360	220,433	8.3	26,263	246,716	10.6	7.3	96,480	42,211	170,749	6.
	1984	281,142	71,496	25.4	27,856	307	41,539	14.8	2.20	.47	18,623,780	210,550	21.5	27,627	238,177	11.6	17.4	107,506	29,626	162,465	
7. Cominco Ltd.	1985	1,461,121	103,131	7.1	(44,763)	(26,609)	(97,220)	—	—	.16	65,038,288	773,800	—	674,438	1,448,238	46.6	—	84,156	128,100	365,906	7.
	1984	1,585,498	229,001	14.4	(5,166)	5,222	24,179	1.5	0.17	.15	64,304,128	876,500	2.8	617,153	1,493,653	41.3	1.6	159,694	122,894	487,136	
8. Falconbridge Ltd.	1985	890,247	80,838	9.1	—	—	38,543	4.3	0.95	—	41,819,000	786,185	4.9	298,244	1,224,880	24.3	3.1	534,105	99,712	437,734	8.
	1984	733,312	97,041	13.2	—	51,492	28,694	3.9	0.85	—	36,335,000	635,994	4.5	297,862	1,038,839	28.7	2.8	414,661	102,760	401,918	
9. Handy & Harman	1985	556,700	29,475	5.3	1,820	—	6,306	1.1	0.46	.66	14,611,432	131,740	4.7	124,481	256,221	48.6	2.5	101,686	26,647	115,292	9.
	1984	619,507	44,990	7.3	9,760	—	14,156	2.3	1.03	.615	14,611,432	134,431	10.7	104,871	239,302	43.8	5.9	101,541	30,708	118,094	
10. Inco Ltd.	1985	1,490,516	197,836	13.3	49,380	—	52,212	3.5	0.28	.20	102,008,704	1,265,552	4.0	859,059	2,124,611	40.4	2.5	505,300	93,229	512,907	10.
	1984	1,467,984	74,695	5.1	22,170	—	(77,343)	—	—	.20	98,062,274	1,315,623	—	1,050,350	2,365,973	44.4	—	494,361	103,578	486,975	
11. Kaiser Aluminum & Chemical Corp.	1985	2,028,600	(52,100)	—	(144,600)	—	(186,500)	—	—	.15	44,261,392	1,122,700	—	1,236,100	2,358,800	52.4	—	416,700	122,300	781,000	11.
	1984	2,184,500	(77,700)	—	(121,000)	—	(97,400)	—	—	.60	43,786,000	1,283,900	—	1,222,000	2,505,900	48.8	—	443,300	240,400	977,800	
12. Newmont Mining Corp.	1985	684,320	(24,642)	—	(45,995)	1,567	(34,850)	—	—	.50	1,337,800	2,358,920	—	2,251,397	4,610,317	48.8	—	675,214	315,918	693,567	12.
	1984	657,296	(13,351)	—	(2,200)	3,811	41,034	6.2	1.35	.50	1,322,199	2,603,582	—	2,287,210	4,890,792	46.8	—	740,090	433,073	1,041,423	
13. Noranda, Inc.	1985	3,438,862	425,898	12.4	(5,200)	(183,192)	(253,873)	—	—	1.00	30,332,469	1,404,131	—	240,762	1,644,893	14.6	—	112,831	310,715	1,039,183	13.
	1984	3,386,617	534,905	15.8	(4,345)	—	(4,451)	—	—	1.00	30,313,833	1,480,901	2.8	201,982	1,682,883	12.0	2.4	180,451	139,477	1,114,329	
14. Olin Corp.	1985	1,751,106	56,646	3.2	(91,695)	(330,000)	(165,354)	—	—	1.50	22,970,629	686,529	—	353,895	1,040,424	34.0	—	695,148	154,449	568,949	14.
	1984	1,800,045	(95,826)	5.3	(29,698)	—	(88,747)	4.9	3.81	1.37	22,899,078	867,307	10.2	369,270	1,236,577	29.9	7.2	754,948	155,087	867,307	
15. Phelps Dodge Corp.	1985	886,635	58,006	6.5	(12,900)	10,600	29,500	3.3	0.61	—	27,143,450	891,055	3.4	448,079	1,339,134	33.5	2.2	170,336	33,973	496,453	15.
	1984	910,067	(94,401)	—	(19,000)	—	(267,846)	—	—	—	24,642,950	828,700	—	591,185	1,419,885	41.6	—	112,615	65,225	480,347	
16. Reynolds Metals Co.	1985	3,495,900	(358,100	—	(60,600)	5,900	(291,600	—	—	1.00	21,788,000	1,151,700	—	1,215,000	2,366,700	51.3	—	421,300	223,200	753,700	16.
	1984	3,793,600	175,500	4.6	44,500	6,300	(137,300	3.6	6.36	1.00	21,558,000	1,341,100	10.7	1,146,100	2,487,200	46.1	5.5	554,500	429,200	1,077,200	

Alcan Aluminium, Ltd.: Approximately half of the $416 million in special charges and rationalization expenses reflects estimated long-term impairment in economic value of bauxite and alumina operations arising from excess world capacity and current and long term demand. Remainder relates to a program to reduce levels of management and employees, to costs associated with sale and restructuring of a number of small businesses, reduction in value of certain overseas investments and write-down of certain raw material inventories. Benefits from tax-loss carryforwards were $36 million in 1985 and $37 million in 1984.

Aluminum Co. of America: Operating profits exclude equity earnings from unconsolidated entities amounting to $3.4 million in 1985 and $38.6 million in 1984. Net loss for 1985 includes charges of $156.9 million covering plant closings and writedowns. Net for the 1984 period includes writedowns of $53.5 million and a $20.5 million gain from sale of a plant.

Amax, Inc.: Results for 1985 include $45 million charge to provide for losses on tungsten and base metals properties and investments, a $45 million charge for anticipated disposition of the agricultural chemicals business, a net gain of $45 million from sale of the iron ore business and $350 million provision for losses on properties and investments. Results for 1984 included a $205.7 million provision for losses on properties and investments.

Asarco, Inc.: Results for 1985 include a $4.5 million charge for closing of a zinc oxide plant. Results for 1984 include charges of $254 million to reflect indefinite suspension or permanent closing of some mines and plants and the writedown of other asset values. There was a $19.7 million loss in 1985 and a $31.7 million gain in 1984 from results of unconsolidated subsidiaries. Liquidation of LIFO inventories resulted in an increase in pretax earning of $14.6 million in 1985.

Brush Wellman, Inc.: Net for 1985 includes a $10.25 million loss from discontinued operations, including $8.2 million for estimated divestiture costs. There was a $307,000 gain from discontinued operations in 1984. Share and per-share figures for 1984 are restated to reflect a two-for-one split of the common stock in June 1984.

Cominco, Ltd.: Canadian dollars.

Falconbridge, Ltd.: Canadian funds. Net for 1984 excludes extraordinary credits of $51.5 million in extraordinary credits in tax benefits from tax-loss carry-forwards and a gain from sale of stock.

Inco, Ltd.: Per share figure for 1985 is before preferred dividend requirements, which exceeded net income. Net sales and operating revenues exclude other income amounting to $34.4 million in 1985 and $48.3 million in 1984. Retained earnings at end of 1985 included an $18 million gain on retirement of Series A preferred shares which was credited directly to retained earnings.

Kaiser Aluminum & Chemical Corp.: Results for 1985 includes $8.3 million loss from discontinued operations of which $5 million covered charges for their sale. Results for 1984 include $60.7 million loss from discontinued operations, of which $60.7 million covered charges for their sale.

Newmont Mining Corp.: Losses from discontinued operations were $8.15 million in 1985 and $1.26 million in 1984. Tax benefits from tax-loss carryforwards amounted to $1.57 milion in 1985 and $3.8 million in 1984. Loss in 1985 from continuing operations included a net charge of $58.8 million for asset writedowns and closings.

Noranda, Inc.: Canadian funds. Extraordinary losses include writedown of carrying value of certain assets resulting in $273.6 million after-tax charge, $34 million provision for loss on contracts for purchase and sale of tin and after-tax gain totaling $124.4 million on sales of investments in associate companies.

Olin Corp.: Results for 1985 includes $19.1 million gain from sale of a discontinued operation. Income from discontinued operations was $25 million. Extraordinary loss relates to company restructuring program. Results for 1984 include $15.3 million gain from discontinued operations.

Phelps Dodge Corp.: Net for 1985 includes $10.6 million tax benefit from tax-loss carry-forward. Results for 1984 cover $207.3 million loss from continuing operations, including pre-tax provision of $110 million for loss on restructuring certain operations, and $60.5 million loss from discontinued operations including $85 million loss from disposal of discontinued operation.

Reynolds Metals Co.: Loss for 1985 includes $313.5 million writedown of certain assets and a $5.9 million tax benefit from tax-loss carryforwards. Net for 1984 includes $6.3 million tax benefit from tax-loss carryforwards and a $14.8 million charge for shutdown of certain facilities.

PRICE & PRODUCTION DATA

(Effective April 14,1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	197	184	192	198
Pittsburgh	248	228	254	240
Youngstown	109	107	116	112
Lake Erie	172	142	156	169
Detroit	144	148	147	146
Chicago	500	518	483	510
Midwest	165	167	161	172
Southern	200	199	202	230
Western	89	87	91	84
U.S. Production	1,824	1,780	1,803	1,861

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8/13/85. **59.4¢—Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢—U.S. Steel as of 8/16/85. 86.9¢—Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs, 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective April 14,1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,824	1,780	25,911	24,716
Capability Utilization Rate	73.8	72.0	71.3	65.6

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 1/1/86)	24.607	24.607	24.607	27.582
Pig Iron** (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 73.83	$ 73.83	$ 73.50	$ 80.50
No. 2 bundles	$ 53.50	$ 53.50	$ 53.83	$ 55.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 73.50	$ 73.50	$ 73.50	$ 83.50
No. 1 steel, Philadelphia	73.50	73.50	72.50	78.50
No. 1 steel, Chicago	74.50	74.50	74.50	79.50
No. 1 bundles, Detroit	62.50	62.50	65.50	76.50
Low Phos., Youngstown	73.50	73.50	73.50	68.50
No. 1 mach'y cast., Pgh	73.50	73.50	73.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	93.50
No. 1 mach'y cast., Chi	109.50	109.50	109.50	111.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective April 14,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	52.83	52.79	4/14/86
Copper (C)	67.00- 71.00	66.50- 71.00	4/11/86
Lead	18.75- 19.00	18.25- 19.00	4/ 9/86
Magnesium Ingot	153.00	148.00	12/ 9/85
Nickel (LME)	183.49	180.26	4/14/86
Zinc	32.00 35.00	35.00	4/ 7/86

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$341.85
Indium, dollars per troy oz.	$2.50
Iridium, dollars per troy oz.	$430.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$265.00-285.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.25
Palladium, per troy oz.	$110.00
Platinum, per troy oz.	$433.00
Rhodium, per troy oz.	$1,150.00
Silver ingots, per troy oz.	$5.385
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

Apr. 7—246.16
Apr. 8—N.Q.
Apr. 9—257.35
Apr. 10—N.Q
Apr. 11—257.72
N.Q.=No Quote

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	64	56
Yellow brass	54	46¼
Red brass	58⅝	49¾
Comm. bronze	60½	50¾
Mang. bronze	42	40½
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	59
No. 2 copper wire	51
Light copper	42

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	47
Light copper	38
No. 1 composition	46
No. 1 comp. turnings	45
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	26
Radiators	34

Aluminum

New mixed clips	41	— 42
Old sheet	38	— 39
Old cast	38	— 39
Clean dry borings	39	— 40

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	31	— 33
Mixed L.C. clips	27	— 28
Old sheets and cast	24	— 25
Borings and turnings	21	— 22
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	47	— 48
No. 2 copper wire	39	— 40
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	35	— 36
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 16
Old diecast zinc	11	— 12

St. Louis price reporting change

Effective April 7, *Iron Age* will no longer list prices for Foundry Steel, 2 ft. in the St. Louis market since the volume of business in this grade is minimal. *Iron Age* will list prices for No. 1 Busheling in that region.

EFFECTIVE APRIL 14, 1986

(Effective April 14,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 73.00 to	$ 74.00
No. 2 hvy. melting	63.00 to	64.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	89.00 to	90.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	84.00 to	85.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	42.00 to	43.00
Low phos. punchings plate	96.00 to	97.00
Heavy turnings	63.00 to	64.00
No. 1 RR hvy. melting	85.00 to	86.00
Rails, 2 ft. and under	95.00 to	96.00
Scrap rails, random lgth	80.00 to	81.00
RR specialties	95.00 to	96.00
No. 1 machinery cast	73.00 to	74.00
Cupola cast	66.00 to	67.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	520.00 to	530.00
18-8 turnings	420.00 to	430.00

Chicago

No. 1 hvy. melting	$ 74.00 to	$ 75.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	87.00 to	88.00
No. 2 dealer bundles	59.00 to	60.00
No. 1 busheling	82.00 to	83.00
Shredder scrap	82.00 to	83.00
Machine shop turnings	31.00 to	32.00
Mixed borings and turnings	32.00 to	33.00
Shoveling turnings	34.00 to	35.00
Cast iron borings	46.00 to	47.00
Low phos. forge crop	99.00 to	100.00
Low phos. punchings plate 1/4 in. and heavier	114.00 to	115.00
Low phos. 2 ft. and under	108.00 to	109.00
No. 1 RR hvy. melting	77.00 to	78.00
Scrap rails random lgth	80.00 to	81.00
Reroller rails	105.00 to	106.00
Rails, 2 ft. and under	101.00 to	102.00
RR couplers and knuckles	93.00 to	94.00
RR car axles	108.00 to	109.00
No. 1 machinery cast	109.00 to	110.00
Cupola cast	94.00 to	95.00
Stove plate	99.00 to	100.00
Steel car wheels	92.00 to	93.00
Stainless		
18-8 bundles and solids	495.00 to	505.00
18-8 turnings	405.00 to	415.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 72.00 to	$ 75.00
No. 2 hvy. melting	63.00 to	66.00
No. 1 dealer bundles	85.00 to	88.00
No. 2 dealer bundles	53.00 to	56.00
No. 1 busheling	85.00 to	88.00
Shredder scrap	83.00 to	86.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	77.00 to	80.00
Low phos. 2 ft. punchings	97.00 to	100.00
Electric furnace bundles	87.00 to	90.00
RR specialties	77.00 to	80.00
Rails, 2 ft. and under	100.00 to	103.00
Cupola cast	89.00 to	92.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 50.00
No. 2 hvy. melting	48.00 to	49.00
No. 1 dealer bundles	62.00 to	63.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	61.00 to	62.00
Drop forge flashings	40.00 to	41.00
Machine shop turnings	25.00 to	26.00
Mixed borings and turnings	9.00 to	10.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	18.00 to	19.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	47.00 to	48.00
Automobile cast	70.00 to	71.00
Stainless		
18-8 bundles and solids	480.00 to	490.00
18-8 turnings	345.00 to	355.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	56.00 to	57.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 dealer bundles	36.00 to	37.00
Machine shop turnings	24.00 to	25.00
Shoveling turnings	24.00 to	25.00
Low phos. plate	73.00 to	74.00
Electric furnace bundles	62.00 to	63.00
Galvanized bundles	60.00 to	61.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 56.00 to	$ 57.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	78.00 to	79.00
No. 1 factory bundles	70.00 to	71.00
No. 2 bundles	33.00 to	34.00
No. 1 busheling	69.00 to	70.00
Machine shop turnings	24.00 to	25.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	21.00 to	22.00
Cut structural & plates, 5 ft. and under	67.00 to	68.00
Cut structural & plates, 2 ft. and under	89.00 to	90.00
Low phos. punchings plate	89.00 to	90.00
Foundry steel, 2 ft. & under	55.00 to	56.00
No. 1 RR hvy. melting	61.00 to	62.00
Rails, 2 ft. and under	90.00 to	91.00
Rails, 18 in, and under	92.00 to	93.00
No. 1 machinery cast	78.00 to	79.00
Mixed cast	45.00 to	46.00
Stainless		
18-8 bundles	480.00 to	490.00
18-8 turnings	350.00 to	360.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	43.00 to	44.00
No. 1 busheling	69.00 to	70.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	30.00 to	31.00
Machine shop turnings	14.00 to	15.00
Mixed boring and turnings	14.00 to	15.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	24.00 to	25.00
Low phos. plate	79.00 to	80.00
Structural and plate, 2 ft. and under	80.00 to	81.00
Rails, 2 ft. and under	80.00 to	81.00
Scrap rails, random lgth	62.00 to	63.00
No. 1 machinery cast	84.00 to	85.00
No. 1 cupola cast	69.00 to	70.00

St. Louis

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	57.00 to	58.00
No. 1 busheling	83.00 to	84.00
No. 1 dealer bundles	81.00 to	82.00
No. 2 bundles	51.00 to	52.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	76.00 to	77.00
Rails, random length	74.00 to	75.00
Rails, 18 in. and under	97.00 to	98.00
RR specialties	81.00 to	82.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	91.00 to	92.00
Steel car wheels	83.00 to	84.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	54.00 to	55.00

Birmingham

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	70.00 to	71.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	25.00 to	26.00
Shoveling turnings	39.00 to	40.00
Cast iron borings	38.00 to	39.00
Electric furnace bundles	65.00 to	66.00
Elec. furnace, 3 ft. & under	66.00 to	67.00
Structural and plate, 2 ft.	89.00 to	90.00
Structural and plate, 4 ft.	83.00 to	84.00
No. 1 RR hvy. melting	83.00 to	84.00
Scrap rails, random lgth	70.00 to	71.00
Rails, 2 ft. and under	87.00 to	88.00
Angles and splice bars	83.00 to	84.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	74.00 to	75.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	77.00 to	78.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	79.00 to	80.00
No. 1 cupola cast	66.00 to	67.00
Heavy breakable cast	27.00 to	28.00
Drop broken cast	72.00 to	73.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	460.00 to	480.00
18-8 turnings	355.00 to	380.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 43.00 to	$ 45.00
No. 2 hvy. melting	37.00 to	39.00
No. 1 dealer bundles	34.00 to	36.00
No. 2 dealer bundles	22.00 to	24.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 37.00 to	$ 39.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 81.00
No. 2 hvy. melting, cut 2 ft. and under	72.00
No. 1 dealer bundles	87.00
No. 2 bundles	61.00
Mixed steel scrap	59.00
Bush. new fact. prep'd	81.00
Bush. new fact. unprp'd	64.00
Machine shop turnings	34.00
Short steel turnings	34.00
Mixed borings and turnings	19.00
Cast scrap	92.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	55.00 to	56.00
No. 2 bundles	40.00 to	41.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	30.00 to	31.00
Shredder scrap	76.00 to	77.00
Cut structural plate, 2 ft. and under	98.00 to	99.00
Cut structural plate, 5 ft. and under	80.00 to	81.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	85.00 to	86.00

STILL NO SIGN OF TAKEOFF FOR ORDERS

Durable goods makers are still looking for an upside orders breakout.

The latest month of complete data shows that orders in February were down 1.2 pct from January. In the latest 12 months through February, orders were up six times and down six times.

Further, the dollar value of orders in February, at $107.2 billion, was actually fractionally lower than it was way back in last August.

There is one dimly bright side to the February orders picture. The decline in orders was due almost entirely to a drop-off in orders for defense-related capital goods. That fall was a whopping 30 pct.

If defense capital goods are excluded from the February totals, then orders were up 1.9 pct. And the big gainer was a 15.7 pct jump in orders for nonelectrical machinery.

Still, that rise bypassed producers in industrial heavy goods lines. It was a big rise in orders for office and computing equipment that accounted for the gain in machinery orders. It was the same office equipment orders that accounted for the sharp rise in nondefense capital goods, as noted on the table here.

One 'plus' sign in the recent trend in durable goods orders, shipments and inventories has been an unbroken eight-month-long slide in inventories. In February, these stocks were some $4.5 billion below the level of last June. So, when orders do show any fresh signs of strength, then reordering for stock should add momentum to the upward thrust at that time.

Note that in the table, the base year for fluid power equipment has been changed to 1985. This applies to data shown for this year, but the old base year of 1972 applies in the case of February of last year. At this time, no index conversion factor is available for 1985 data.

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted Source: U.S. Dept of Commerce		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	1st Qtr*	$402.1	$389.0	$371.2
Manufacturing, Total	1st Qtr*	154.7	155.7	145.7
Manufacturing, Durable Goods	1st Qtr*	72.0	73.5	69.9
Mining Industry	1st Qtr*	15.3	15.2	15.7
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	Feb.	107.2	108.5	102.5
Shipments	Feb.	105.3	105.9	101.7
Inventories	Feb.	187.8	188.5	192.0
Unfilled Orders	Feb.	355.8	353.0	359.9
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	Feb.	28.8	24.6	29.5
Capital Goods Producers Defense Industries	Feb.	7.2	10.4	6.7
Primary Metals, Total	Feb.	10.6	10.6	10.0
Steel (SIC 331)	Feb.	4.6	4.2	4.4
Iron & Steel Castings (SIC 332)	Feb.	1.2	1.4	1.1
Nonferrous Metals	Feb.	4.8	5.0	4.5
Nonelectrical Mach.-Equip. Industries, Total	Feb.	18.4	15.9	20.5
Engines & Turbines	Feb.	1.4	1.3	1.2
Farm Machinery & Equipment (Shipments)	Feb.	0.8	0.9	0.7
Construction, Mining & Mat. Hdlg. Equip	Feb.	3.0	3.2	2.5
General Industrial Machinery	Feb.	1.4	1.4	1.3
Fluid Power Equipment** (Index-1985=100)	Feb.	105.0	122.0	279.0
Metalworking Machinery	Feb.	0.8	0.8	0.9
Machine Tools, Total ($Mill., Unadjusted)***	Feb.	211.1	190.8	237.5
Machine Tools, Metalcutting***	Feb.	168.8	135.0	163.8
Machine Tools, Metalforming***	Feb.	42.3	55.8	73.7
Electrical Mach. & Equip. Industries, Total	Feb.	15.8	15.3	14.5
Elec. Transmission Equip. & Ind. Apparatus	Feb.	1.9	2.2	1.8
Household Appliances	Feb.	1.3	1.5	1.4
Communication Equipment	Feb.	5.7	5.5	5.0
Transportation Equipment, Total	Feb.	28.5	31.0	24.8
Motor Vehicles & Parts (Shipments)	Feb.	18.5	19.4	17.5
Aircraft, Missiles & Parts	Feb.	8.8	10.9	6.1
Shipbuilding & Military Tanks	Feb.	0.2	-0.1	0.1
Fabricated Metal Products, Total	Feb.	13.9	14.3	13.0
Instruments, Total	Feb.	4.7	4.9	4.8

*Est.—Commerce Dept; **Source: National Fluid Power Assn.; ***Source: NMTBA.

C2150-8

IRON AGE

MAY 16, 1986

MANUFACTURING MANAGEMENT

Honda Goes American

CK014CONGRESSION00
OC185
CONGRESSIONAL INFO SERV / DIR
SRI ACQUISITIONS
4520 EAST WEST HWY
BETHESDA MD 20814

OSHA'S RIGHT-TO-KNOW RULES
AUTOMATION UPGRADES THE FOREMAN'S ROLE
IN PURSUIT OF QUALITY: GRINDING

MAY 16, 1986 VOL. 229, NO. 10

IRON AGE
MANUFACTURING MANAGEMENT

Departments

LETTERS 7

EDITORIAL STAFF 8

INDUSTRY BRIEFS 18

PRODUCT & EQUIPMENT REVIEW 56

AD INDEX 58

BUSINESS STAFF 58

MANAGEMENT SERVICE CARD 59

FREE LITERATURE 61

P&P DATA 4/28 64

FERROUS SCRAP 4/28 65

CLEARING HOUSE 66

Editorial 5
Who's at fault here? Guess again.

Newswatch 11
Union leaders ask Congress to limit imports.

Honda 21
Honda's Ohio plants set new standards in automaking.

Nissan 32
Its Tennessee plant is matching the quality of its Japanese plants.

Right-To-Know 36
Are you ready for OSHA's new regulations?

Grinding 41
Industry focuses on abusive grinding.

Supervisors 47
Just as plants update, so do their foremen.

Shipbuilding 53
Cost-effective replacement for HY-80?

Materials Report 62
Steel orders point to a long, slow summer.

Price Trends 68
Not a price rout, but almost.

Next Issue: Sheet steels.

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year, $85 Canada/Foreign (24 issues); Metalsproducer edition—$30 one year; $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 3017, Wheaton, IL, 60189.

Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES

PRICE & PRODUCTION DATA

(Effective April 28,1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	183	184	172	192
Pittsburgh	236	241	237	227
Youngstown	103	105	114	111
Lake Erie	146	163	157	170
Detroit	133	149	147	147
Chicago	505	509	513	496
Midwest	174	170	173	164
Southern	198	205	201	228
Western	93	88	84	88
U.S. Production	1,771	1,814	1,798	1,823

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton	58.0*
Pellets (per iron unit natural)	gross-ton	59.4**
Pellets (per iron unit natural)	gross-ton	72.5-86.9***
Mesabi, regular-unscreened	gross-ton	$32.53
Mesabi, non-bessemer	gross-ton	$30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8/13/85. **59.4¢—Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢—U.S. Steel as of 8/16/85. 86.9¢—Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs, 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective April 28,1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,771	1,814	29,489	28,385
Capability Utilization Rate	71.6	73.3	71.5	66.3

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 1/1/86)	24.607	24.607	24.607	27.582
Pig Iron** (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	$ 72.83	$ 73.17	$ 73.83	$ 72.83
No. 2 bundles	$ 52.50	$ 52.83	$ 54.50	$ 52.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 72.50	$ 73.50	$ 73.50	$ 77.50
No. 1 steel, Philadelphia	71.50	71.50	73.50	71.50
No. 1 steel, Chicago	74.50	74.50	74.50	69.50
No. 1 bundles, Detroit	62.50	62.50	62.50	66.50
Low Phos., Youngstown	73.50	73.50	73.50	58.50
No. 1 mach'y cast., Pgh	73.50	73.50	73.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	93.50
No. 1 mach'y cast., Chi	109.50	109.50	109.50	109.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective April 28,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	54.18	51.61	4/28/86
Copper (C)	66.50-71.00	67.00-71.00	4/25/86
Lead	18.75-19.00	18.25-19.00	4/ 9/86
Magnesium Ingot	153.00	148.00	12/ 9/85
Nickel (LME)	180.71	181.71	4/28/86
Zinc	33.00-35.00	32.00-35.00	4/22/86

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Loredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$343.40
Indium, dollars per troy oz.	$2.65
Iridium, dollars per troy oz.	$430.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$270.00-285.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.25
Palladium, per troy oz.	$111.00
Platinum, per troy oz.	$422.00
Rhodium, per troy oz.	$1,150.00
Silver ingots, per troy oz.	$5.045
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

Apr. 21—262.38
Apr. 22—262.14
Apr. 23—261.85
Apr. 24—260.20
Apr. 25—257.57

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	63	56
Yellow brass	53⅛	46¼
Red brass	57¾	49¾
Comm. bronze	59½	50½
Mang. bronze	41¾	40½
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	59
No. 2 copper wire	51
Light copper	42

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	47
Light copper	38
No. 1 composition	46
No. 1 comp. turnings	45
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	26
Radiators	34

Aluminum

New mixed clips	40	— 41
Old sheet	37	— 38
Old cast	37	— 38
Clean dry borings	38	— 39

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	29	— 30
Mixed L.C. clips	26	— 28
Old sheets and cast	24	— 25
Borings and turnings	20	— 21
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	47	— 48
No. 2 copper wire	39	— 40
Light copper	33	— 34
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	35	— 36
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 16
Old diecast zinc	11	— 12

EFFECTIVE APRIL 28, 1986

(Effective April 28, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	86.00 to	87.00
No. 1 factory bundles (auto)	86.00 to	87.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	84.00 to	85.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	42.00 to	43.00
Low phos. punchings plate	96.00 to	97.00
Heavy turnings	62.00 to	63.00
No. 1 RR hvy. melting	81.00 to	82.00
Rails, 2 ft. and under	95.00 to	96.00
Scrap rails, random lgth	80.00 to	81.00
RR specialties	95.00 to	96.00
No. 1 machinery cast	73.00 to	74.00
Cupola cast	66.00 to	67.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	520.00 to	530.00
18-8 turnings	420.00 to	430.00

Chicago

No. 1 hvy. melting	$ 74.00 to	$ 75.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	87.00 to	88.00
No. 2 dealer bundles	59.00 to	60.00
No. 1 busheling	82.00 to	83.00
Shredder scrap	82.00 to	83.00
Machine shop turnings	31.00 to	32.00
Mixed borings and turnings	32.00 to	33.00
Shoveling turnings	34.00 to	35.00
Cast iron borings	46.00 to	47.00
Low phos. forge crop	99.00 to	100.00
Low phos. punchings plate 1/4 in. and heavier	114.00 to	115.00
Low phos. 2 ft. and under	108.00 to	109.00
No. 1 RR hvy. melting	77.00 to	78.00
Scrap rails random lgth	80.00 to	81.00
Reroller rails	105.00 to	106.00
Rails, 2 ft. and under	101.00 to	102.00
RR couplers and knuckles	93.00 to	94.00
RR car axles	108.00 to	109.00
No. 1 machinery cast	109.00 to	110.00
Cupola cast	94.00 to	95.00
Stove plate	99.00 to	100.00
Steel car wheels	92.00 to	93.00
Stainless		
18-8 bundles and solids	495.00 to	505.00
18-8 turnings	405.00 to	415.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 70.00 to	$ 73.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	82.00 to	85.00
No. 2 dealer bundles	50.00 to	53.00
No. 1 busheling	82.00 to	85.00
Shredder scrap	83.00 to	86.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	75.00 to	78.00
Low phos. 2 ft. punchings	96.00 to	99.00
Electric furnace bundles	87.00 to	90.00
RR specialties	75.00 to	78.00
Rails, 2 ft. and under	97.00 to	100.00
Cupola cast	88.00 to	91.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 50.00
No. 2 hvy. melting	48.00 to	49.00
No. 1 dealer bundles	62.00 to	63.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	61.00 to	62.00
Drop forge flashings	40.00 to	41.00
Machine shop turnings	25.00 to	26.00
Mixed borings and turnings	9.00 to	10.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	18.00 to	19.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	47.00 to	48.00
Automobile cast	70.00 to	71.00
Stainless		
18-8 bundles and solids	480.00 to	490.00
18-8 turnings	345.00 to	355.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	56.00 to	57.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 dealer bundles	36.00 to	37.00
Machine shop turnings	24.00 to	25.00
Shoveling turnings	24.00 to	25.00
Low phos. plate	73.00 to	74.00
Electric furnace bundles	62.00 to	63.00
Galvanized bundles	60.00 to	61.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 56.00 to	$ 57.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	78.00 to	79.00
No. 1 factory bundles	68.00 to	69.00
No. 2 bundles	33.00 to	34.00
No. 1 busheling	69.00 to	70.00
Machine shop turnings	24.00 to	25.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	21.00 to	22.00
Cut structural & plates, 5 ft. and under	67.00 to	68.00
Cut structural & plates, 2 ft. and under	89.00 to	90.00
Low phos. punchings plate	89.00 to	90.00
Foundry steel, 2 ft. & under	55.00 to	56.00
No. 1 RR hvy. melting	61.00 to	62.00
Rails, 2 ft. and under	90.00 to	91.00
Rails, 18 in. and under	92.00 to	93.00
No. 1 machinery cast	78.00 to	79.00
Mixed cast	45.00 to	46.00
Stainless		
18-8 bundles	480.00 to	490.00
18-8 turnings	350.00 to	360.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	43.00 to	44.00
No. 1 busheling	69.00 to	70.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	30.00 to	31.00
Machine shop turnings	14.00 to	15.00
Mixed boring and turnings	14.00 to	15.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	24.00 to	25.00
Low phos. plate	77.00 to	78.00
Structural and plate, 2 ft. and under	78.00 to	79.00
Rails, 2 ft. and under	78.00 to	79.00
Scrap rails, random lgth	62.00 to	63.00
No. 1 machinery cast	74.00 to	75.00
No. 1 cupola cast	69.00 to	70.00

St. Louis

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	57.00 to	58.00
No. 1 busheling	83.00 to	84.00
No. 1 dealer bundles	81.00 to	82.00
No. 2 bundles	51.00 to	52.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	76.00 to	77.00
Rails, random length	74.00 to	75.00
Rails, 18 in. and under	97.00 to	98.00
RR specialties	81.00 to	82.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	91.00 to	92.00
Steel car wheels	83.00 to	84.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	54.00 to	55.00

Birmingham

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	70.00 to	71.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	25.00 to	26.00
Shoveling turnings	39.00 to	40.00
Cast iron borings	38.00 to	39.00
Electric furnace bundles	65.00 to	66.00
Elec. furnace, 3 ft. & under	66.00 to	67.00
Structural and plate, 2 ft.	89.00 to	90.00
Structural and plate, 4 ft.	83.00 to	84.00
No. 1 RR hvy. melting	83.00 to	84.00
Scrap rails, random lgth	70.00 to	71.00
Rails, 2 ft. and under	87.00 to	88.00
Angles and splice bars	83.00 to	84.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	74.00 to	75.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	77.00 to	78.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	79.00 to	80.00
No. 1 cupola cast	66.00 to	67.00
Heavy breakable cast	27.00 to	28.00
Drop broken cast	72.00 to	73.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	450.00 to	470.00
18-8 turnings	345.00 to	370.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 43.00 to	$ 45.00
No. 2 hvy. melting	37.00 to	39.00
No. 1 dealer bundles	34.00 to	36.00
No. 2 dealer bundles	22.00 to	24.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 37.00 to	$ 39.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 81.00
No. 2 hvy. melting, cut 2 ft. and under	72.00
No. 1 dealer bundles	87.00
No. 2 bundles	61.00
Mixed steel scrap	59.00
Bush. new fact. prep'd	81.00
Bush. new fact. unprp'd	64.00
Machine shop turnings	34.00
Short steel turnings	34.00
Mixed borings and turnings	19.00
Cast scrap	92.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	55.00 to	56.00
No. 2 bundles	38.00 to	39.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	30.00 to	31.00
Shredder scrap	76.00 to	77.00
Cut structural plate, 2 ft. and under	98.00 to	99.00
Cut structural plate, 5 ft. and under	80.00 to	81.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	85.00 to	86.00

NOT A PRICE ROUT, BUT ALMOST

It looked like a price rout in March. But it wasn't quite that bad. Exclude the continuing collapse in energy goods prices, and the overall price level of industrial goods didn't do anything. Prices didn't go up, and they didn't go down—to any measurable extent.

In the first quarter, the U.S. Labor Dept.'s producer price index for finished goods scored the largest decline for any three-month period since the index was first calculated in 1947. Falling energy prices for the most part accounted for the record drop.

In March, prices of finished energy goods plummeted by 13.4 pct. Those prices fell 9.4 pct in February. Gasoline prices in March fell 21.9 pct, following an 11.1 pct drop in February. Home heating oil prices in March fell 6.0 pct, following an all-time record 26.2 pct decline in the previous month.

Looking beyond energy goods, producer prices in March were still soft. An example is seen in the 22 metalworking product lines listed on the table. During the month, nine had price gains, all modest except in one case. Prices were unchanged for six of the product lines and seven saw declines. So, 13 of the 22 lines of goods experienced either no price changes or had actual declines.

Still, there is a reminder that prices have not yet fallen through the floor. A look at price changes from a year ago shows March prices higher for 20 of the 22 listed product lines.

The price softness through the first quarter was the big-swing force in the economy. The 3.2 pct first quarter advance in GNP was largely the result of lower inflation.

While many cheer all the lower prices, some companies find the great price sag makes life tough for them. Many customers hold off buying, awaiting even lower prices.

Latest Month Covered: March 1986

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	399.1	+ 0.5	+ 1.4
Metal Forming Machine Tools	438.4	0	+ 1.4
Agricultural Machinery & Equip.	338.8	+ 0.2	+ 0.1
Construction Machinery & Equip.	365.7	+ 0.1	+ 0.9
Oil and Gas Field Machinery	424.0	0	— 0.8
Industrial Material Handling Equip.	295.3	0	+ 0.4
Pumps, Compressors & Allied Equip.	357.9	+ 0.2	+ 0.5
Mining Machinery & Equipment	381.9	— 0.1	+ 0.9
Mechanical Power Transmission Equip.	342.2	+ 0.4	+ 2.1
Automobiles	229.1	— 0.2	+ 1.1
Motor Trucks—Light	307.3	+ 0.4	+ 4.2
Motor Trucks—Heavy	340.2	0	+ 2.3
Railroad Equipment	364.6	— 0.1	+ 0.5
Fabricated Metal Structural Products	315.1	— 0.2	+ 0.2
Electric Motors	349.3	— 0.1	— 0.1
Valves & Fittings (Dec. 1982 = 100)	106.2	0	+ 1.8
Ball & Roller Bearings	354.2	+ 0.2	+ 2.0
Foundry & Forge Shop Products	364.8	— 0.1	+ 0.6
Heating Equipment	264.7	— 0.1	+ 2.8
Plumbing Fixtures & Brass Fittings	324.6	+ 2.7	+ 5.5
Metal Containers	361.2	0	+ 0.9
Internal Combustion Engines	349.6	+ 0.2	+ 2.9

Data based on U.S. Labor Dept.'s Producer Price Inde

C2150-8

IRON AGE

JUNE 6, 1986

MANUFACTURING MANAGEMENT

NEW PLAYERS
IN THE
FACTORY AUTOMATION GAME

CK014CONGRESSION00
NOV86
CONGRESSIONAL INFO SERV / DIR
SRI ACQUISITIONS
4520 EAST WEST HWY
BETHESDA MD 20814

JUNE 6, 1986 VOL. 229, NO. 11

IRON AGE
MANUFACTURING MANAGEMENT

Departments

LETTERS 6
EDITORIAL STAFF 6
INDUSTRY BRIEFS 16
PRODUCT & EQUIPMENT REVIEW 51
AD INDEX 58
BUSINESS STAFF 58
MANAGEMENT SERVICE CARD 59
P&P DATA 5/12 62
FERROUS SCRAP 5/12 64
CLEARING HOUSE 66

Editorial 5
Are even God's pockets deep enough?

Newswatch 11
Though shipments are rising, service center profits are falling.

You and Your Job 18
Executives breakfast on profit margins and papaya juice.

Automation 19
More players are joining the factory automation game.

Welding 29
U.S. welding is holding its own against foreign competitors.

Sheet Steel 35
AISI's lettering system makes it easier to chose the right one.

Product Liability 46
Industry takes its case to Capitol Hill.

Steel/Nonferrous Earnings 50A1
Steel is lackluster; lower prices hold nonferrous in check.

Materials Report 57
The soft pace of orders prompts steel mills to delay price hikes.

Order Trends 68
Still, little good news for orders.

Next Issue: An Update on CAD/CAM Systems.

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year, $85 Canada/Foreign (24 issues); Metalproducer edition—$30 one year; $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 3017, Wheaton, IL 60189.

Chilton
ONE OF THE ABC PUBLISHING COMPANIES

NEW PLAYERS
IN THE
FACTORY AUTOMATION GAME

Because change is so rampant in the factory automation industry, it is difficult to keep track of the players.

BY ROBERT E. HARVEY

Selling automation solutions to industry is an inconstant occupation. In my desk are a dozen business cards of people in the factory automation business who have changed jobs at least three times in the past four years.

And it is not only the employees who come and go. Companies supplying automation equipment and services play the same game of musical chairs.

Because change is so rampant, it is difficult to keep track of the players.

However, keeping track of the automation vendors and their offerings is critical. In a world of rapidly increasing competition, the firm that knows what is available and who supplies it holds a decided edge.

What follows is a glance at a few areas in the automation marketplace where change is occurring rapidly—areas where a manufacturer might want to cast a sharp eye.

One segment that has seen a deluge of new players in recent years—and in recent months—has been CAD/CAM (computer-aided design/computer-aided manufacturing). CAD/CAM in its broadest sense, that is. Computers integrated into the entire concept-to-design-to-fabrication cycle of a product. When broadly defined, CAD/CAM includes a wide variety of disciplines.

In the early days, CAD/CAM suppliers grew successful by offering turnkey—complete hardware and software systems. Companies like Computervision, Calma, and Applicon, helped popularize a technology that is still the heart of manufacturing modernization efforts today. However, their success not only produced profits but a rash of new competitors.

Because they supply a wide range of CAD/CAM services, the turnkey CAD/CAM vendors have become vulnerable to focused players who direct products to particular segments of the market.

What has happened, says Larry McArthur, president of Aries Technology, Inc., Lowell, Mass., is that vendors of turnkey CAD/CAM systems have tried to be all things to all people but have only been partially successful. For example, some 95 pct of the systems are still used exclusively for drafting.

"What these turnkey firms had going for them," explained Mr. McArthur, "was that each started out with a helluva good drafting system. Then, users began shopping for CAD/CAM by committee. A committee would contain representatives from a firm's concept design engineering group, its structural analysis group, and various tool engineering groups. To accommodate everyone, CAD/CAM vendors made marketing arrangements with various software suppliers.

"Each person wanted something different, but nobody bothered to figure out if the form that the vendors brought these technologies into their CAD/CAM system was acceptable to the users."

Too often, he explained, the customer ended up with a solids modeling package that differed from the drafting package. The drafting package would not work with the analysis package which, in turn, differed from the numerical control package. Different data structures and user interfaces produced major incompatibility problems.

Because of incompatible products, a fuzzy focus and high costs, the turnkey companies became vulnerable to snipers.

New Players Emerge

According to Daratech Assoc., Cambridge, Mass., a firm that researches the CAD/CAM marketplace, in late 1982 a number of small companies such as Daisy, Mentor, Metheus, Apollo, Orcatech, CADLINC (CIMLINC), CAE Systems, EAS, VLSI Technology, Formtek, Graphic Horizons and others began marketing advanced CAD/CAM systems based on networked workstations using 32-bit micro-processors with multiple coprocessors, and large memories.

Lately, personal computers—often the IBM PC AT—has become the computer of choice for innovators. These new players are focusing on CAD/CAM applications inadequately served by older vendors: concept engineering, for example.

"The environment in which today's concept engineers (the initial designers of a product) work has changed little in decades. While many functions surrounding them have been automated, they still work largely in a manual environment," said Richard Miller, vice president, Aries.

Although poorly served until now, several firms such as Aries and Cognition Inc., Billerica, Mass., are moving to address the concept engineer's needs. Cognition is offering the Mechanical Advantage 1000 mechanical computer-aided engineering (MCEA) system this spring, while the Aries' product will be available this fall.

The need to optimize the conceptual design is critical, emphasized Linda Popky, manager, marketing communications, Cognition. The design conception stage is important in determining ultimate product cost, performance, and reliability. However, she noted, engineers do not use CAD systems for this task because they are difficult to learn and frustrating to use.

More importantly, the concept engineer needs a versatile product that is easy to use. Both the Aries and the Cognition system appear to fill that bill. The mechanical engineer would normally initiate a design with a pencil and paper sketch. With the Cognition Mechanical Advantage 1000, using SketchPad, putting design concepts into the system is like sketching with pencil and paper. SketchPad enhances free-hand geometry creation by recognizing geometric constraints specified by the engineer. For example, if the engineer hand-draws two approximately parallel lines, the system has the ability to recognize them as perfectly parallel lines.

Cognition's Advantage allows engineers to optimize product design at the concept stage.

Quick Analysis

After developing the initial geometry, the engineer now wants to analyze design variations. He does not want detailed, time-consuming, analysis tools but quick and easy tests to determine which variation is the most promising. Both Aries and Cognition offer this capability.

A feature of the Cognition Advantage is its ability to build an engineering model that includes geometry, analytical methods and the corresponding engineering principles. A change to sketch geometry automatically causes an update to the related engineering equations and vice versa. The Advantage also offers online engineering handbooks, allowing the designer to rapidly find appropriate information.

Finally, the system provides a product cost guide by bringing together design and process information. The cost guide also can suggest suitable processes for manufacturing the product. The Advantage includes a Cognition Applications Engine Plus, based on a DEC MicroVAX II, networked to augmented IBM PC AT workstations.

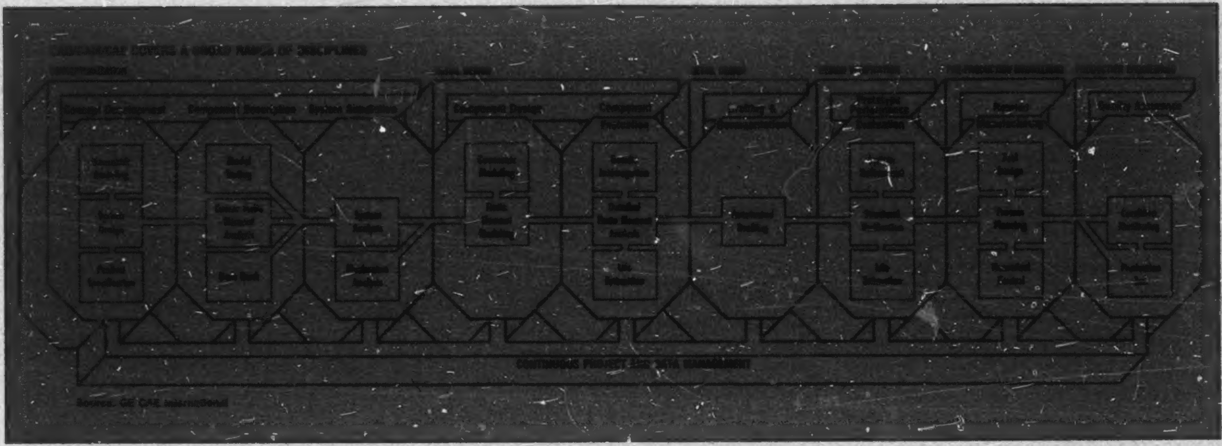
The Aries product also includes an IBM PC AT, opening up the world of IBM software to the engineer. Since engineers spend only one-third of their time designing, a workstation with word processing capability, for example, makes sense.

Three benefits of the Aries offering are low cost (under $40,000), the ability to run a variety of software, and the capability do preliminary design analysis; but another is the ability to do solids modeling.

Increasingly, companies are looking to base all their CAD/CAM activities on data-rich solids models.

(Cont. on p. 25.)

INTENTIONAL
BLANK



Source: GE CAE International

"But up till now solids modeling has been ineffective," said Mr. McArthur. "It is too slow. It only runs on big mainframes. And it is not interactive but a batch process."

By speeding it up, Aries intends to make solids modeling a useful tool. The firm developed specific accelerator hardware that accelerates an IBM PC AT about 250 times faster than normal in the specific computer domains that improve solids modeling performance.

While Aries and Cognition focus on the concept engineer, other companies are targeting other niches along the CAD/CAM spectrum. Docugraphix, Inc., Cupertino, Calif., for instance, concentrates in integrating CAD and documentation. "The basic problem manufacturers faces is making last minute substitutions and design changes prior to shipping a product," explained D.R. Taylor, president and CEO. "These substitutions must be reflected in manufacturing drawings, manufacturing instructions and technical manuals."

Documentation

Since Docugraphix offers a CAD system with fully-integrated text composition capabilities, firms can keep documentation up-to-date. The system can generate new documentation, including manufacturing drawings, manufacturing instructions, purchase part drawings and specifications, and technical publications. It also can handle engineering change notices, is icon- and menu-driven, and uses windows to permit work on multiple documents.

Many new product offerings (like those from Aries and Cognition) incorporate IBM personal computers, but PC usage in CAD/CAM is several years old. In 1982 a company called Autodesk, Inc., Sausalito, Calif., introduced computer-aided design and drafting software that could run on an IBM PC. Before that, CAD/CAM had been done on a mainframe or a minicomputer. But due to the growing power of the microcomputer, and the introduction of the IBM PC AT in particular, CAD/CAM on a PC became a reality. Though a PC can not match the speed and power of larger computers, most companies only use CAD/CAM for two-dimensional detail drafting—a task nicely handled in most cases by a microcomputer.

And while CAD/CAM buyers in the past wanted do-everything systems, they are now buying micro-based tools that can handle just their needs. Faced with paying $100,000 or $200,000 per station for a minicomputer-based system compared to $10,000 or $20,000 for micro-based product, it becomes illuminating to watch how fast the criteria for acceptance change.

Presently there are a number of micro-CAD/CAM vendors, with Autodesk far and away the most successful. But again, new players continue to show up. For example, CADAM, Inc., Burbank, Calif., has just arrived with Micro-CADAM. CADAM is a wholly-owned independent subsidiary within Lockheed Corp.'s Information Systems Group. Unlike other firms supplying CAD/CAM software for the PC, CADAM Inc. is not a new company but the world's largest supplier of CAD/CAM software. IBM markets CADAM for its mainframes and uses the software internally.

Micro-CADAM is a micro-computer-based version of CADAM and offers many of the features of the mainframe version. Designed for the PC AT (or XT) Micro-CADAM can be used independently or in conjunction with an IBM mainframe. Because Micro-CADAM is a subset of the mainframe product, data files can be easily transferred among micros, workstations and mainframe systems. Complex design and engineering projects can be developed on a micro, then uploaded to mainframe CADAM take advantage of larger memory and mainframe modules such as 3-D interactive design, solids modeling, finite element analysis and numerical control.

A number of developments are forcing change on the CAD/CAM industry. One is the growing use of the IBM PC family, which in turn, is prompting customers to expect more price/performance on desktop hardware. Because of the current low cost of CAD/CAM, many people—on the shop floor, especially—are buying systems that never touched a CAD/CAM terminal before.

In another trend, customers are shying away from custom hardware and demanding CAD/CAM software run on standard industry computers: an IBM, Apollo, Sun, or DEC product, for example. Both movements

PRICE & PRODUCTION DATA

(Effective May 12,1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	189	192	197	181
Pittsburgh	243	244	248	199
Youngstown	101	107	109	108
Lake Erie	123	125	172	148
Detroit	151	127	144	153
Chicago	484	496	500	505
Midwest	173	172	165	143
Southern	192	199	200	236
Western	93	84	89	94
U.S. Production	1,749	1,746	1,824	1,767

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8/13/85. **59.4¢—Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢—U.S. Steel as of 8/16/85. 86.9¢—Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs, 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective May 12,1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,749	1,746	32,984	31,930
Capability Utilization Rate	70.7	70.6	71.4	66.6

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 1/1/86)	24.607	24.607	24.607	27.582
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 71.50	$ 71.50	$ 73.83	$ 70.17
No. 2 bundles	$ 52.17	$ 52.17	$ 53.50	$ 49.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 70.50	$ 70.50	$ 73.50	$ 72.50
No. 1 steel, Philadelphia	71.50	71.50	73.50	69.50
No. 1 steel, Chicago	72.50	72.50	74.50	68.50
No. 1 bundles, Detroit	57.50	57.50	62.50	64.50
Low Phos., Youngstown	70.50	70.50	73.50	57.50
No. 1 mach'y cast., Pgh	73.50	73.50	73.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	91.50
No. 1 mach'y cast., Chi	107.50	107.50	109.50	108.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective May 12,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	53.48	53.22	5/12/86
Copper (C)	66.50-68.00	67.00-68.00	5/12/86
Lead	19.00-20.00	18.75-20.00	5/ 5/86
Magnesium Ingot	153.00	148.00	12/ 9/85
Nickel (LME)	183.57	182.22	5/12/86
Zinc	35.00	33.00-35.00	5/ 6/86

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$345.45
Indium, dollars per troy oz.	$2.65
Iridium, dollars per troy oz.	$423.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$270.00-285.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.25
Palladium, per troy oz.	$109.00
Platinum, per troy oz.	$418.00
Rhodium, per troy oz.	$1,150.00
Silver ingots, per troy oz.	$5.235
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

May 5—257.78
May 6—254.48
May 7—254.04
May 8—250.43
May 9—247.47

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	63	56
Yellow brass	53⅛	45¼
Red brass	57¾	48¾
Comm. bronze	59½	49¾
Mang. bronze	41	40
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	59
No. 2 copper wire	51
Light copper	42

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	47
Light copper	38
No. 1 composition	46
No. 1 comp. turnings	45
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	26
Radiators	34

Aluminum

New mixed clips	37	— 38
Old sheet	35	— 36
Old cast	35	— 36
Clean dry borings	35	— 37

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	29	— 30
Mixed L.C. clips	26	— 28
Old sheets and cast	24	— 25
Borings and turnings	20	— 21
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	48	— 49
No. 2 copper wire	39	— 40
Light copper	33	— 34
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	35	— 36
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 16
Old diecast zinc	11	— 12

EFFECTIVE MAY 12,1986

(Effective May 12,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	60.00 to	61.00
No. 1 dealer bundles	83.00 to	84.00
No. 1 factory bundles (auto)	86.00 to	87.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	80.00 to	81.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	42.00 to	43.00
Low phos. punchings plate	99.00 to	100.00
Heavy turnings	60.00 to	61.00
No. 1 RR hvy. melting	81.00 to	82.00
Rails, 2 ft. and under	95.00 to	96.00
Scrap rails, random lgth	80.00 to	81.00
RR specialties	95.00 to	96.00
No. 1 machinery cast	73.00 to	74.00
Cupola cast	66.00 to	67.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	520.00 to	530.00
18-8 turnings	420.00 to	430.00

Chicago

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	68.00 to	69.00
No. 1 dealer bundles	84.00 to	85.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	58.00 to	59.00
No. 1 busheling	79.00 to	80.00
Shredder scrap	79.00 to	80.00
Machine shop turnings	30.00 to	31.00
Mixed borings and turnings	25.00 to	26.00
Shoveling turnings	32.00 to	33.00
Cast iron borings	44.00 to	45.00
Low phos. forge crop	99.00 to	100.00
Low phos. punchings plate 1/4 in. and heavier	114.00 to	115.00
Low phos. 2 ft. and under	108.00 to	109.00
No. 1 RR hvy. melting	76.00 to	77.00
Scrap rails random lgth	79.00 to	80.00
Reroller rails	104.00 to	105.00
Rails, 2 ft. and under	101.00 to	102.00
RR couplers and knuckles	92.00 to	93.00
RR car axles	106.00 to	107.00
No. 1 machinery cast	107.00 to	108.00
Cupola cast	94.00 to	95.00
Stove plate	99.00 to	100.00
Steel car wheels	89.00 to	90.00
Stainless		
18-8 bundles and solids	495.00 to	505.00
18-8 turnings	405.00 to	415.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 70.00 to	$ 73.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	81.00 to	84.00
No. 2 dealer bundles	50.00 to	53.00
No. 1 busheling	80.00 to	83.00
Shredder scrap	83.00 to	86.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	37.00 to	40.00
Low phos. 5 ft. and under	75.00 to	78.00
Low phos. 2 ft. punchings	96.00 to	99.00
Electric furnace bundles	83.00 to	86.00
RR specialties	75.00 to	78.00
Rails, 2 ft. and under	97.00 to	100.00
Cupola cast	87.00 to	90.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	46.00 to	47.00
No. 1 dealer bundles	57.00 to	58.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	56.00 to	57.00
Drop forge flashings	38.00 to	39.00
Machine shop turnings	27.00 to	28.00
Mixed borings and turnings	9.00 to	10.00
Shoveling turnings	27.00 to	28.00
Cast iron borings	18.00 to	19.00
Heavy breakable cast	31.00 to	32.00
Mixed cupola cast	46.00 to	47.00
Automobile cast	70.00 to	71.00
Stainless		
18-8 bundles and solids	480.00 to	490.00
18-8 turnings	345.00 to	355.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 56.00 to	$ 57.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 dealer bundles	33.00 to	34.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Low phos. plate	70.00 to	71.00
Electric furnace bundles	59.00 to	60.00
Galvanized bundles	57.00 to	58.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 dealer bundles	73.00 to	74.00
No. 1 factory bundles	67.00 to	68.00
No. 2 bundles	31.00 to	32.00
No. 1 busheling	65.00 to	66.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Cut structural & plates, 5 ft. and under	65.00 to	66.00
Cut structural & plates, 2 ft. and under	87.00 to	88.00
Low phos. punchings plate	87.00 to	88.00
Foundry steel, 2 ft. & under	53.00 to	54.00
No. 1 RR hvy. melting	59.00 to	60.00
Rails, 2 ft. and under	88.00 to	89.00
Rails, 18 in. and under	90.00 to	91.00
No. 1 machinery cast	78.00 to	79.00
Mixed cast	45.00 to	46.00
Stainless		
18-8 bundles	480.00 to	490.00
18-8 turnings	350.00 to	360.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 busheling	66.00 to	67.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	13.00 to	14.00
Mixed boring and turnings	13.00 to	14.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	23.00 to	24.00
Low phos. plate	74.00 to	75.00
Structural and plate, 2 ft. and under	75.00 to	76.00
Rails, 2 ft. and under	75.00 to	76.00
Scrap rails, random lgth	61.00 to	62.00
No. 1 machinery cast	74.00 to	75.00
No. 1 cupola cast	69.00 to	70.00

St. Louis

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 busheling	80.00 to	81.00
No. 1 dealer bundles	79.00 to	80.00
No. 2 bundles	48.00 to	49.00
Machine shop turnings	19.00 to	20.00
Shoveling turnings	23.00 to	24.00
Cast iron borings	29.00 to	30.00
No. 1 RR hvy. melting	74.00 to	75.00
Rails, random length	74.00 to	75.00
Rails, 18 in. and under	97.00 to	98.00
RR specialties	78.00 to	79.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	45.00 to	46.00
Stove plate	91.00 to	92.00
Steel car wheels	80.00 to	81.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	54.00 to	55.00

Birmingham

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	70.00 to	71.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	36.00 to	37.00
Electric furnace bundles	65.00 to	66.00
Elec. furnace, 3 ft. & under	64.00 to	67.00
Structural and plate, 2 ft.	87.00 to	88.00
Structural and plate, 4 ft.	81.00 to	82.00
No. 1 RR hvy. melting	81.00 to	82.00
Scrap rails, random lgth	70.00 to	71.00
Rails, 2 ft. and under	87.00 to	88.00
Angles and splice bars	81.00 to	82.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	72.00 to	73.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	77.00 to	78.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	77.00 to	78.00
No. 1 cupola cast	64.00 to	65.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	70.00 to	71.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	450.00 to	470.00
18-8 turnings	345.00 to	370.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 43.00 to	$ 45.00
No. 2 hvy. melting	37.00 to	39.00
No. 1 dealer bundles	34.00 to	36.00
No. 2 dealer bundles	22.00 to	24.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 37.00 to	$ 39.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 76.00
No. 2 hvy. melting, cut 2 ft. and under	67.00
No. 1 dealer bundles	82.00
No. 2 bundles	58.00
Mixed steel scrap	56.00
Bush. new fact. prep'd	77.00
Bush. new fact. unprp'd	60.00
Machine shop turnings	30.00
Short steel turnings	30.00
Mixed borings and turnings	19.00
Cast scrap	92.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 63.00 to	$ 64.00
No. 2 hvy. melting	52.00 to	53.00
No. 2 bundles	36.00 to	37.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	28.00 to	29.00
Shredder scrap	73.00 to	74.00
Cut structural plate, 2 ft. and under	96.00 to	97.00
Cut structural plate, 5 ft. and under	75.00 to	76.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	85.00 to	86.00

STILL, LITTLE GOOD NEWS FOR ORDERS

The flow of new orders to durable goods makers has been coming in fits and starts. That has been true for a long time now.

The latest month of completed orders data was March—and it was another bummer. Orders, at $105.6 billion, were down 2.1 pct from February, which, in turn, was down 0.6 pct from January. During the nine-month period ending at the close of March, orders were down six times and up only three times.

The March orders volume of $105.6 billion looks a bit pale against the $107.7 billion volume far back in August of last year.

The recent pattern of orders for durable goods has defied many economists who, earlier this year, forecast a strengthening of orders in the first quarter. Now, many economists are calling for a strong last half for orders. So are many executives in durables lines.

Order volume in March would have shown an even sharper decline than the 2.1 pct recorded except that ever-bouncing defense-goods orders bounced upward at a more than 40 pct increase during the month.

The big hope of economists for the second half lies in expected sharp orders gains in computers and related durable goods lines. This hope is based largely on an expected cyclical rebound in those products, a falling dollar, a rising yen, continuing low interest rates and surging economies in Europe that portend greater world buying of U.S. goods.

However, forecasts and actual trend lines have lately been on different tracks for a number of key economic measures. For example, despite all the 'good signs,' the U.S. trade deficit actually worsened through the first four months of the year.

Orders right now seem to be at a critical point on a trip to somewhere—but where? And when?

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted Source: U.S. Dept of Commerce		Latest Month or Qtr.	Previous Month or Qtr.	Sa Period Year Ag
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	1st Qtr*	$402.1	$389.0	$371.2
Manufacturing, Total	1st Qtr*	154.7	155.7	145.7
Manufacturing, Durable Goods	1st Qtr*	72.0	73.6	69.
Mining Industry	1st Qtr*	15.3	15.2	15.
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	March	105.6	107.8	99.5
Shipments	March	103.2	105.8	102.1
Inventories	March	188.2	187.6	192.4
Unfilled Orders	March	360.0	357.6	353.6
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	March	27.4	28.9	27.2
Capital Goods Producers Defense Industries	March	10.4	7.2	6.2
Primary Metals, Total	March	9.7	10.6	10.0
Steel (SIC 331)	March	4.0	4.5	4.1
Iron & Steel Castings (SIC 332)	March	1.2	1.3	1.2
Nonferrous Metals	March	4.5	4.8	4.7
Nonelectrical Mach.-Equip. Industries, Total	March	17.1	18.6	18.
Engines & Turbines	March	1.1	1.4	1.1
Farm Machinery & Equipment (Shipments)	March	0.8	0.8	1.0
Construction, Mining & Mat. Hdlg. Equip	March	3.3	3.1	3.1
General Industrial Machinery	March	1.4	1.4	1.5
Metalworking Machinery	March	0.9	0.8	1.1
Machine Tools, Total ($Mill., Unadjusted)**	March	214.8	210.4	279.
Machine Tools, Metalcutting**	March	159.7	168.6	227.
Machine Tools, Metalforming**	March	55.1	4[illegible].8	52.3
Electrical Mach. & Equip. Industries, Total	March	17.0	15.7	15.9
Elec. Transmission Equip. & Ind. Apparatus	March	2.2	1.9	2.1
Household Appliances	March	1.3	1.3	1.3
Communication Equipment	March	6.2	5.7	6.
Transportation Equipment, Total	March	24.5	26.5	22.5
Motor Vehicles & Parts (Shipments)	March	16.1	18.5	16.2
Aircraft, Missiles & Parts	March	7.5	7.9	5.0
Shipbuilding & Military Tanks	March	0.7	-0.1	0.
Fabricated Metal Products, Total	March	13.9	14.3	13.
Instruments, Total	March	4.6	4.7	4.

[illegible]

C2150-8

IRON AGE

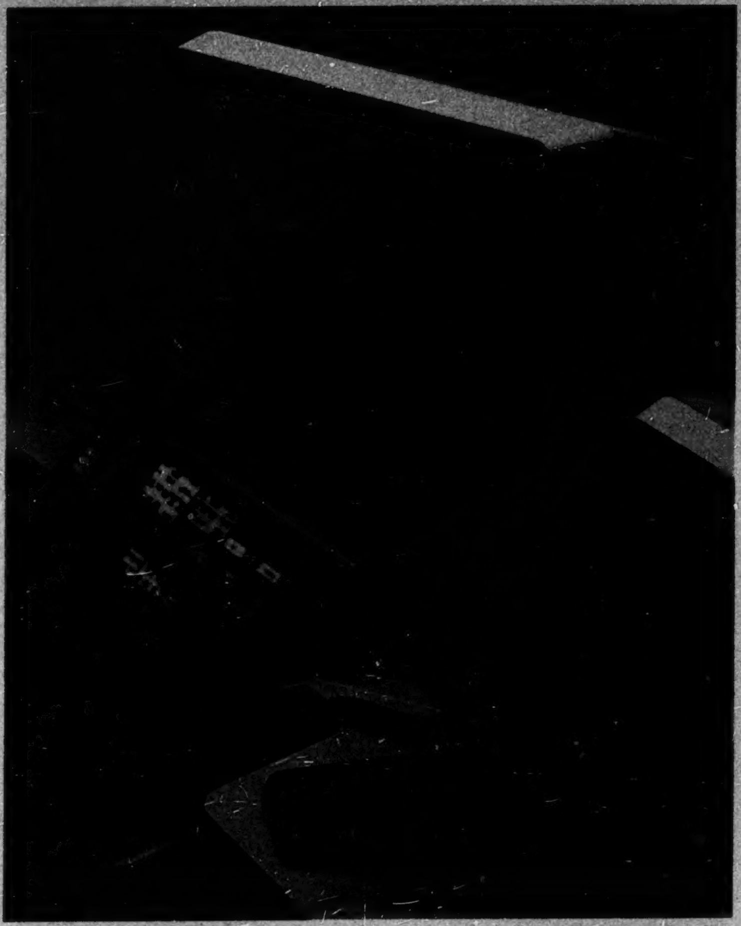
JUNE 20, 1986

MANUFACTURING MANAGEMENT

CAD/CAM DRIVES DEEP INTO THE FACTORY

JUNE 20, 1986 VOL. 229, NO. 12

IRON AGE
MANUFACTURING MANAGEMENT



Editorial 7
Do you draw these same conclusions?

Newswatch 13
The U.S. will ask four nations to limit machine tool exports.

CAD/CAM 21
Less compatible in the past, these two are becoming a pair.

Special Promotion Section J-1
Japan's advances in materials and machine tools.

AIM Tech 51
Standard programming for NC machine tools can provide benefits.

Make-or-Buy 56
Why U.S. manufacturers are starting to buy more, make less.

Materials Report 69
Steelmakers are taking different paths as they restructure.

Price Trends 80
A price turnaround may be shaping up.

Next Issue: Third Quarter Forecast.

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year, $85 Canada/Foreign (24 issues). Metalsproducer edition—$30 one year, $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 3017, Wheaton, IL, 60189.

Departments

EDITORIAL STAFF 10
LETTERS 10
PRODUCT & EQUIPMENT REVIEW 63
FYI 70
MANAGEMENT SERVICE CARD 71
AD INDEX 73
BUSINESS STAFF 73
P&P DATA 5/23 74
FERROUS SCRAP 5/23 76
CLEARING HOUSE 78

PRICE & PRODUCTION DATA

(Effective May 19,1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	185	189	184	175
Pittsburgh	248	243	241	227
Youngstown	109	101	105	102
Lake Erie	115	123	163	153
Detroit	156	151	149	158
Chicago	451	484	509	489
Midwest	167	173	170	150
Southern	195	192	205	249
Western	91	93	88	97
U.S. Production	1,717	1,749	1,814	1,800

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton	58.0*
Pellets (per iron unit natural)	gross-ton	59.4**
Pellets (per iron unit natural)	gross-ton	72.5-86.9***
Mesabi, regular-unscreened	gross-ton	$32.53
Mesabi, non-bessemer	gross-ton	$30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8/13/85. **59.4¢—Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢—U.S. Steel as of 8/16/85. 86.9¢—Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs, 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective May 19,1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,717	1,749	34,701	33,725
Capability Utilization Rate	69.4	70.7	71.3	66.8

Composite Prices (Effective May 23, 1986)	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 5/19/86)	24.850	24.850	24.607	27.582
Pig Iron** (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 71.50	$ 71.50	$ 73.17	$ 70.17
No. 2 bundles	$ 52.17	$ 52.17	$ 52.83	$ 49.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 70.50	$ 70.50	$ 73.50	$ 72.50
No. 1 steel, Philadelphia	71.50	71.50	71.50	69.50
No. 1 steel, Chicago	72.50	72.50	74.50	68.50
No. 1 bundles, Detroit	57.50	57.50	62.50	64.50
Low Phos., Youngstown	70.50	70.50	73.50	57.50
No. 1 mach'y cast., Pgh	73.50	73.50	73.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	91.50
No. 1 mach'y cast., Chi	107.50	107.50	109.50	108.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective May 23,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	52.64	53.03	5/26/86
Copper (C)	64.50-68.00	65.00-68.00	5/23/86
Lead	19.25-20.00	19.00-20.00	5/22/86
Magnesium Ingot	153.00	148.00	12/ 9/85
Nickel (LME)	183.28	184.73	5/26/86
Zinc	35.00	33.00-35.00	5/ 6/86

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$341.10
Indium, dollars per troy oz.	$2.65
Iridium, dollars per troy oz.	$420.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$270.00-285.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.25
Palladium, per troy oz.	$108.00
Platinum, per troy oz.	$407.00
Rhodium, per troy oz.	$1,160.00
Silver ingots, per troy oz.	$5.16
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

May 19—243.60
May 20—242.79
May 21—242.92
*May 22—243.01
May 23—N.A.

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	62	56
Yellow brass	52¼	46¼
Red brass	57	49¾
Comm. bronze	58½	50¾
Mang. bronze	41¼	40½
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	58
No. 2 copper wire	50
Light copper	41

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	54
No. 2 copper wire	46
Light copper	37
No. 1 composition	46
No. 1 comp. turnings	45
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	26
Radiators	34

Aluminum

New mixed clips	33	— 34
Old sheet	32	— 33
Old cast	32	— 33
Clean dry borings	33	— 34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	28	— 29
Mixed L.C. clips	26	— 27
Old sheets and cast	24	— 25
Borings and turnings	20	— 21
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	48	— 49
No. 2 copper wire	39	— 40
Light copper	33	— 34
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	35	— 36
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 16
Old diecast zinc	11	— 12

EFFECTIVE MAY 23,1986

(Effective May 23,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	60.00 to	61.00
No. 1 dealer bundles	83.00 to	84.00
No. 1 factory bundles (auto)	86.00 to	87.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	80.00 to	81.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	42.00 to	43.00
Low phos. punchings plate	99.00 to	100.00
Heavy turnings	60.00 to	61.00
No. 1 RR hvy. melting	80.00 to	81.00
Rails, 2 ft. and under	93.00 to	94.00
Scrap rails, random lgth	78.00 to	79.00
RR specialties	93.00 to	94.00
No. 1 machinery cast	73.00 to	74.00
Cupola cast	66.00 to	67.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	520.00 to	530.00
18-8 turnings	420.00 to	430.00

Chicago

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	68.00 to	69.00
No. 1 dealer bundles	83.00 to	84.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	58.00 to	59.00
No. 1 busheling	79.00 to	80.00
Shredder scrap	79.00 to	80.00
Machine shop turnings	30.00 to	31.00
Mixed borings and turnings	25.00 to	26.00
Shoveling turnings	32.00 to	33.00
Cast iron borings	44.00 to	45.00
Low phos. forge crop	99.00 to	100.00
Low phos. punchings plate 1/4 in. and heavier	114.00 to	115.00
Low phos. 2 ft. and under	108.00 to	109.00
No. 1 RR hvy. melting	76.00 to	77.00
Scrap rails random lgth	79.00 to	80.00
Reroller rails	104.00 to	105.00
Rails, 2 ft. and under	101.00 to	102.00
RR couplers and knuckles	92.00 to	93.00
RR car axles	106.00 to	107.00
No. 1 machinery cast	107.00 to	108.00
Cupola cast	94.00 to	95.00
Stove plate	99.00 to	100.00
Steel car wheels	89.00 to	90.00
Stainless		
18-8 bundles and solids	495.00 to	505.00
18-8 turnings	405.00 to	415.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 70.00 to	$ 73.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	50.00 to	53.00
No. 1 busheling	80.00 to	83.00
Shredder scrap	82.00 to	85.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	37.00 to	40.00
Low phos. 5 ft. and under	75.00 to	78.00
Low phos. 2 ft. punchings	94.00 to	97.00
Electric furnace bundles	83.00 to	86.00
RR specialties	75.00 to	78.00
Rails, 2 ft. and under	95.00 to	98.00
Cupola cast	85.00 to	88.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	46.00 to	47.00
No. 1 dealer bundles	57.00 to	58.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	56.00 to	57.00
Drop forge flashings	38.00 to	39.00
Machine shop turnings	27.00 to	28.00
Mixed borings and turnings	9.00 to	10.00
Shoveling turnings	27.00 to	28.00
Cast iron borings	18.00 to	19.00
Heavy breakable cast	31.00 to	32.00
Mixed cupola cast	46.00 to	47.00
Automobile cast	70.00 to	71.00
Stainless		
18-8 bundles and solids	480.00 to	490.00
18-8 turnings	345.00 to	355.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 dealer bundles	67.00 to	68.00
No. 2 dealer bundles	31.00 to	32.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Low phos. plate	70.00 to	71.00
Electric furnace bundles	59.00 to	60.00
Galvanized bundles	57.00 to	58.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	70.00 to	71.00
No. 1 factory bundles	64.00 to	65.00
No. 2 bundles	29.00 to	30.00
No. 1 busheling	62.00 to	63.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Cut structural & plates, 5 ft. and under	65.00 to	66.00
Cut structural & plates, 2 ft. and under	87.00 to	88.00
Low phos. punchings plate	87.00 to	88.00
Foundry steel, 2 ft. & under	53.00 to	54.00
No. 1 RR hvy. melting	59.00 to	60.00
Rails, 2 ft. and under	88.00 to	89.00
Rails, 18 in. and under	90.00 to	91.00
No. 1 machinery cast	78.00 to	79.00
Mixed cast	45.00 to	46.00
Stainless		
18-8 bundles	480.00 to	490.00
18-8 turnings	350.00 to	360.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 busheling	66.00 to	67.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	13.00 to	14.00
Mixed boring and turnings	13.00 to	14.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	23.00 to	24.00
Low phos. plate	74.00 to	75.00
Structural and plate, 2 ft. and under	75.00 to	76.00
Rails, 2 ft. and under	75.00 to	76.00
Scrap rails, random lgth	61.00 to	62.00
No. 1 machinery cast	74.00 to	75.00
No. 1 cupola cast	69.00 to	70.00

St. Louis

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 busheling	80.00 to	81.00
No. 1 dealer bundles	79.00 to	80.00
No. 2 bundles	48.00 to	49.00
Machine shop turnings	19.00 to	20.00
Shoveling turnings	23.00 to	24.00
Cast iron borings	29.00 to	30.00
No. 1 RR hvy. melting	74.00 to	75.00
Rails, random length	74.00 to	75.00
Rails, 18 in. and under	97.00 to	98.00
RR specialties	78.00 to	79.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	45.00 to	46.00
Stove plate	91.00 to	92.00
Steel car wheels	80.00 to	81.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	54.00 to	55.00

Birmingham

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	70.00 to	71.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	36.00 to	37.00
Electric furnace bundles	65.00 to	66.00
Elec. furnace, 3 ft. & under	66.00 to	67.00
Structural and plate, 2 ft.	87.00 to	88.00
Structural and plate, 4 ft.	81.00 to	82.00
No. 1 RR hvy. melting	81.00 to	82.00
Scrap rails, random lgth	70.00 to	71.00
Rails, 2 ft. and under	87.00 to	88.00
Angles and splice bars	81.00 to	82.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	72.00 to	73.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	77.00 to	78.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	77.00 to	78.00
No. 1 cupola cast	64.00 to	65.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	70.00 to	71.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 42.00 to	$ 43.00
No. 2 hvy. melting	33.00 to	34.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	450.00 to	470.00
18-8 turnings	345.00 to	370.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 51.00
No. 2 hvy. melting	39.00 to	41.00
No. 1 dealer bundles	50.00 to	52.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	56.00 to	58.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	72.00 to	77.00
Mixed cupola cast	44.00 to	46.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	20.00 to	21.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 34.00 to	$ 36.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	67.00 to	69.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 76.00
No. 2 hvy. melting, cut 2 ft. and under	67.00
No. 1 dealer bundles	82.00
No. 2 bundles	58.00
Mixed steel scrap	56.00
Bush. new fact. prep'd	77.00
Bush. new fact. unprp'd	60.00
Machine shop turnings	30.00
Short steel turnings	30.00
Mixed borings and turnings	19.00
Cast scrap	92.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 63.00 to	$ 64.00
No. 2 hvy. melting	52.00 to	53.00
No. 2 bundles	36.00 to	37.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	28.00 to	29.00
Shredder scrap	73.00 to	74.00
Cut structural plate, 2 ft. and under	96.00 to	97.00
Cut structural plate, 5 ft. and under	75.00 to	76.00
Unstripped motor blocks	57.00 to	58.00
Cupola cast	85.00 to	86.00

A PRICE TURNAROUND MAY BE SHAPING UP

Producer prices for finished goods fell in each of the first four months of the year. At the close of April, these prices were down by 2.1 pct from a year earlier.

Still, it appears that a price 'bottoming' is shaping up. The price plunge has been led by lower tags for energy goods, and these prices are starting to firm.

For example, the price index for finished energy goods fell 8.4 pct in April. That's a big slide, but it pales next to the 13.4 pct drop in March. The easing off of price declines in energy goods translated directly into an easing of the overall price index for producers' finished goods in April. These prices declined by 0.6 pct.

Prices for capital equipment, while soft, marched to a different beat in recent months. These tags were up 0.3 pct in April.

In the case of capital equipment in April, the largest increases were for motor vehicles and pumps. Note on the table here that prices for light motor trucks in April rose by a stiff 2.0 pct from March—and were up 6.3 pct from a year earlier.

The newly-emerging price firmness is apparent in a glance at recent *Iron Age* producer price tables. There are 22 key metalworking product lines listed on the table. In April, prices for 16 of the lines showed price increases. In March, only nine of the lines showed price increases.

It appears that many producers are desperate for price relief. At the first sign competitors may be holding or raising prices, companies are quick to do so themselves. Given the new price firming in energy goods and the anxiety of corporate managers to get their tags up, a strong price turnaround could be in the making.

Latest Month Covered: April 1986

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	400.7	+ 0.4	+ 1.3
Metal Forming Machine Tools	438.5	0	+ 1.5
Agricultural Machinery & Equip.	339.4	+ 0.2	+ 0.3
Construction Machinery & Equip.	366.1	+ 0.1	+ 1.2
Oil and Gas Field Machinery	424.1	0	– 0.7
Industrial Material Handling Equip.	296.0	+ 0.2	+ 0.6
Pumps, Compressors & Allied Equip.	361.0	+ 0.9	+ 1.4
Mining Machinery & Equipment	381.8	0	+ 0.9
Mechanical Power Transmission Equip.	343.9	+ 0.5	+ 1.9
Automobiles	232.8	+ 1.6	+ 2.9
Motor Trucks—Light	313.4	+ 2.0	+ 6.3
Motor Trucks—Heavy	340.4	+ 0.1	+ 2.2
Railroad Equipment	365.7	+ 0.3	+ 0.8
Fabricated Metal Structural Products	315.1	0	+ 0.2
Electric Motors	349.7	+ 0.1	– 0.3
Valves & Fittings (Dec. 1982 = 100)	107.2	+ 0.9	+ 2.8
Ball & Roller Bearings	355.6	+ 0.4	+ 2.3
Foundry & Forge Shop Products	365.3	+ 0.1	+ 0.7
Heating Equipment	267.3	+ 1.0	+ 3.6
Plumbing Fixtures & Brass Fittings	322.6	– 0.6	+ 3.6
Metal Containers	360.9	– 0.1	+ 0.8
Internal Combustion Engines	353.0	+ 1.0	+ 3.4

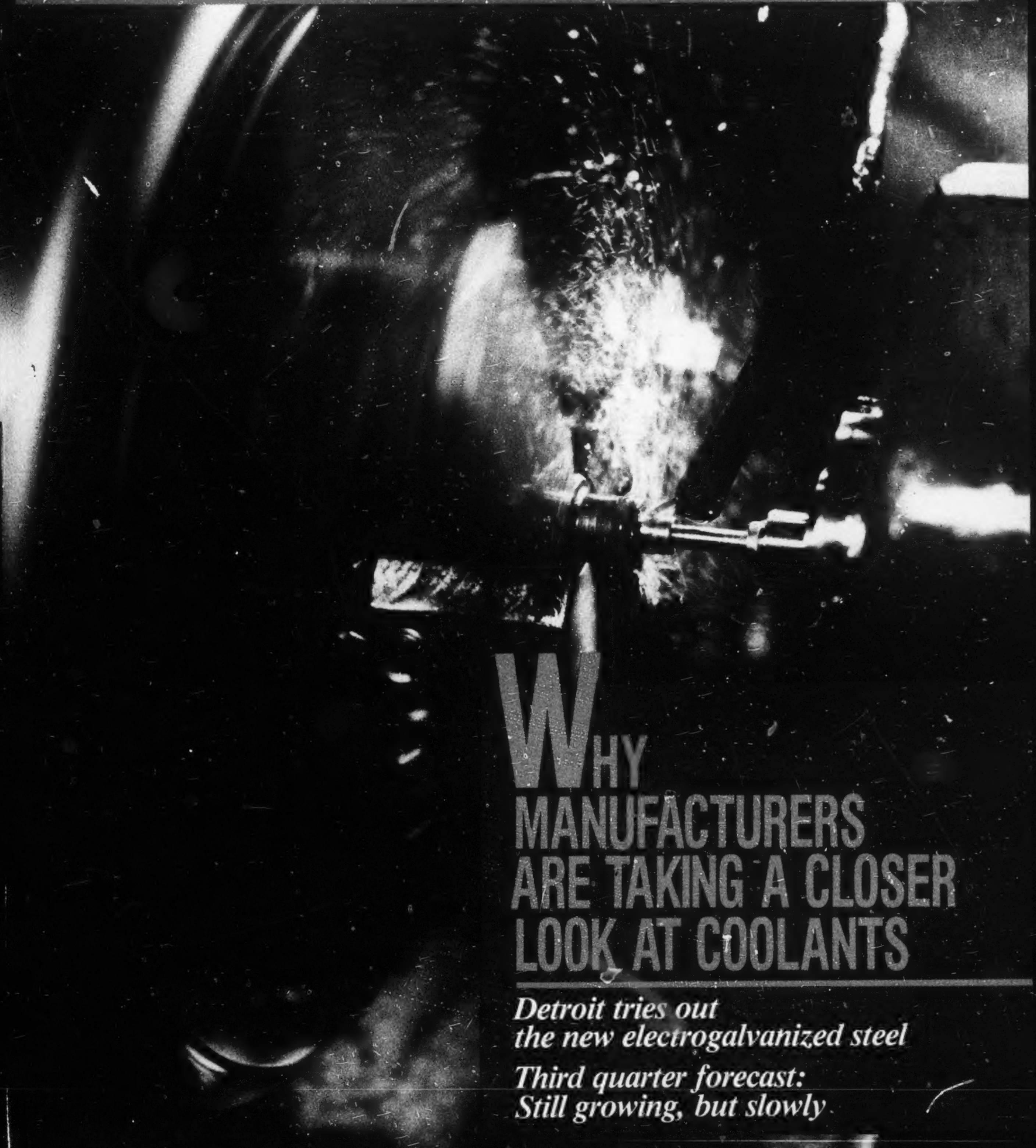
Data based on U.S. Labor Dept.'s Producer Price Index

C2150-8A

IRON AGE

JULY 4, 1986

MANUFACTURING MANAGEMENT



WHY MANUFACTURERS ARE TAKING A CLOSER LOOK AT COOLANTS

Detroit tries out the new electrogalvanized steel

Third quarter forecast: Still growing, but slowly

JULY 4, 1986 VOL. 229, NO. 13

IRON AGE
MANUFACTURING MANAGEMENT

Cover Photo courtesy of General Electric Co.

Editorial 5
Who got the real bashing?

Newswatch 13
House trade bill could ruin the economy, says the President.

You and Your Job 18
Retained employees need survival kits, too.

Third Quarter Forecast 20
For business, it's a tough climb in a growing economy.

STEEL 23
NONFERROUS METALS 25
AUTOMOTIVE 26
HEAVY EQUIPMENT 26
MACHINE TOOLS 29
FLUID POWER 29
METAL COATINGS 31
PLASTICS 31
COMPUTERS 32
INSTRUMENTS & CONTROLS 32
APPLIANCES 33
MATERIAL HANDLING 33
CASTINGS 34
FORGINGS 34
WELDING 37
HEAT TREATING 37
STAMPINGS 40
FASTENERS 40
AIRCRAFT 43

Electrogalvanizing 44
Detroit puts the new electrogalvanized steel to the test.

Lubricants 58
Why manufacturers are taking a closer look at coolants.

Materials Report 71
Domestic steel consumption is expected to decline.

Order Trends 76
Orders' softness is still hanging on.

Next Issue: FMS for the Small Plant.

Departments

EDITORIAL STAFF 6
FYI 66
MANAGEMENT SERVICE CARD 67
AD INDEX 69
BUSINESS STAFF 69
PRODUCT & EQUIPMENT REVIEW 70
P&P DATA 6/16 72
FERROUS SCRAP 6/16 73
CLEARING HOUSE 74

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year, $85 Canada/Foreign (24 issues). Metalsproducer edition—$30 one year, $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 2040, Radnor, PA, 19089.

Chilton
ONE OF THE ABC PUBLISHING COMPANIES

3RD QUARTER REPORT:

TOUGH GOING IN A GROWTH ECONOMY

Business is on the climb, but at a slowed rate. The sluggish pace has hurt plant spending, already battered by record capital goods imports. Any growth for metalworking this year will be hard won.

BY JOHN D. BAXTER

Is the business expansion going to continue through this quarter and to year-end?

Economists, almost to a man, are shouting a resounding 'yes' to that question.

What's more, the seers see not only expansion through the rest of this year, but for all of next year as well. In fact, most see even better times in 1987.

All the glowing forecasts would seem to call for some loud cheering. But there are sections of the business grandstand where cheers seem muffled—or, are heard not at all.

Those sections are where capital goods producers sit. Along with energy goods producers. And along with suppliers to the agricultural sector.

Those elements in the economy, at best, have lately been growing at rates well below those of the overall economy. And, at the worst, they have been fighting to hold their ground, shaky as it is.

These lagging sectors of the economy have long held onto the straw of hope that as long as the economy grew strongly, there was a chance they eventually might be swept along in the rising tide. But that hope is now being put to a test.

The U.S. Commerce Dept. said the economy grew at 3.7 pct annual rate in the opening quarter of the year. (The latest complete quarterly data compiled by the government). But, even that gain—from a tepid 0.7 pct prior-quarter rise—yielded growth of only 2.0 pct over the most recent four-quarter period. That compared to a 5.2 pct growth rate for the prior four-quarter period.

Other Factors

There are two other factors straining confidence of the laggers—and all others— right now.

First, the opening quarter 3.7 pct growth rate was not nearly as strong as it appeared. Almost all of the thrust came from a big increase in inventories. If the economy, in the first quarter, was measured by Final Sales (GNP less change in inventories), then there was no growth during the period. In fact, there was a slide of 0.7 pct.

The other point about the latest growth rate report that is worrisome is the fact that business capital investment declined by 13.6 pct from the previous quarter.

It is hard to see, at this time, just how business fixed investment can grow strongly through the rest of the year. This investment is now sagging, and the business expansion that has been its great hope for a revival, is showing signs of slowing.

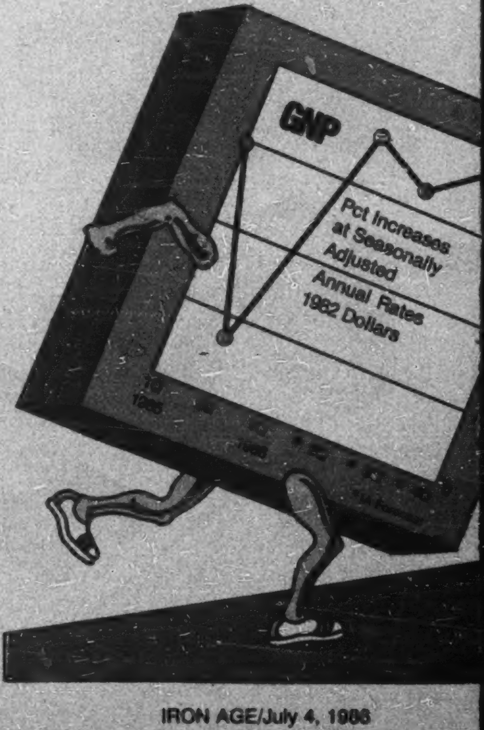
Recently, the Conference Board's Forum of 13 economic analysts forecast a growth in real GNP this year of 3.3 pct, and growth next year of 3.5 pct. Still, in the face of this rather rosy forecast, the Forum predicted a 3 pct *decline* in real capital spending.

This plant spending forecast came on the heels of one made in April by the U.S. Commerce Dept. based on its latest quarterly survey of thousands of business executives. This report forecast for 1986 a piddling 0.9 pct increase in real capital spending by business. (This would follow growth of 15.1 pct in 1984, and 7.5 pct in 1985).

Notably, in the Commerce Dept. survey, real plant spending by manufacturers this year is forecast to *decline* by 0.9 pct from last year. And more particularly, a decline of 2.9 pct is forecast for those manufacturers making durable goods.

Mixed Signals

One economist has noted that when economic signs become greatly mixed, it is a sign that a transition is about to take place in a business cycle. If his theory holds up, an economic shift could


GNP
Pct Increases at Seasonally Adjusted Annual Rates 1982 Dollars
1Q 1985
1986

be in the making; signs are really mixed right now.

A case in point on mixed signals: There are two leading quarterly surveys of consumer buying attitudes—those of the University of Michigan's Institute for Social Research (ISR), and The Conference Board. In a release dated May 30, the ISR reported consumer buying attitudes at "record high levels." The Conference Board, in a release dated just five days later, reported, "...the largest dip in consumer confidence in a year," and that "buying plans fell sharply."

There seems to be wide agreement that these are especially tough days to get a handle on the economy. One reason is that, to an unusual degree, a mix of short-term business cycle forces and long-term structural trends are each exerting leverage on the U.S. economy at the same time.

For example, the short-term business cycle is in an expansion phase— and has been since November of 1982. But, at the same time, a number of key manufacturing industries are in a long-term phase of restructuring and contraction. That collision of forces partly explains the lag in capital investment that is taking place in the middle of a short-term business expansion cycle.

There is a long list of factors that account for the plant spending slowdown—a slowdown that has backed up to affect a great many metalworking companies. First and foremost, has been foreign competition.

For example, as recently as 1970, some 6 pct of capital goods bought in this country were imports. Last year, 20 pct of all capital goods bought in this country were imports. By any standard, that's a huge loss of market share for U.S. capital goods producers over a relatively short period of time. In itself, it is almost enough to explain why U.S. capital goods producers are having lean days while an economic upcycle is in motion.

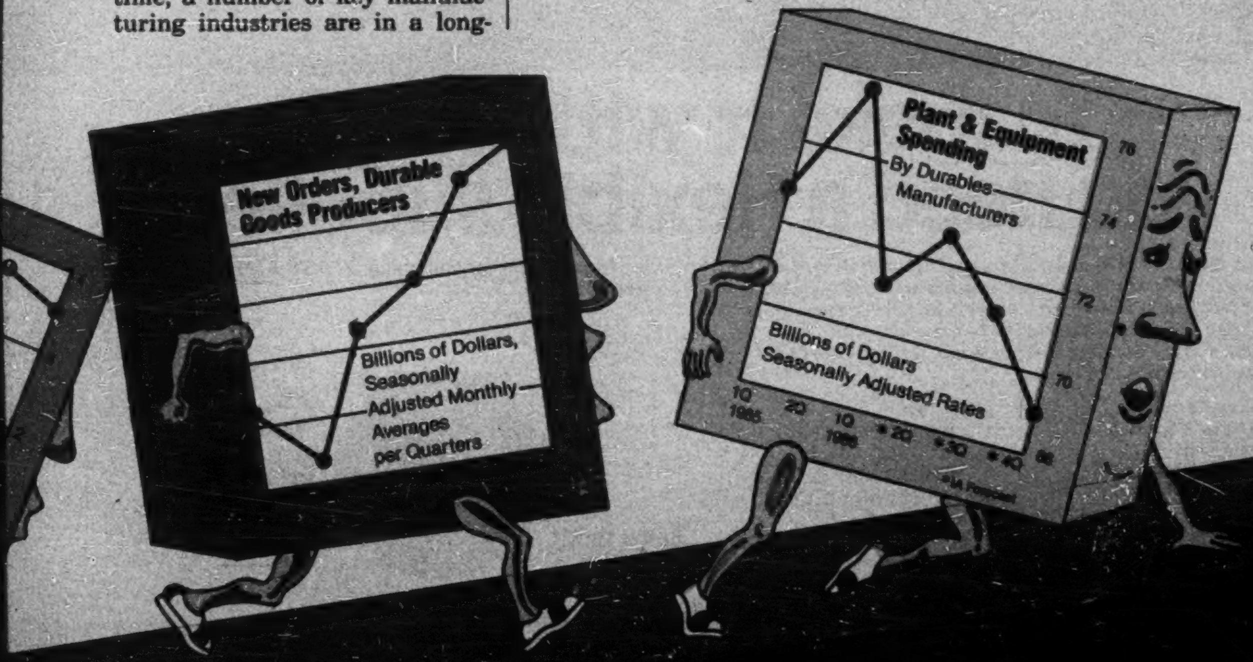
The list of reasons why plant spending has not, and is not, doing well, goes on. Orders for industry durable goods have been on plateau for a long time, industrial production has had little steam in it since the summer of 1984 and plant utilization rates are running at below-par levels.

It all adds up that basic goods industries, which are the ones most affected by capital investment slowdowns, are now caught in an economic setting that foretells little growth through the end of this year.

What could change this possible scenario for the better?

Well, for one, the hard-to-predict consumer, for reasons of his own, could take off on a spending spree. Or, possibly, the settling of the tax bill could unleash a lot of held-in-check business spending. Or, the big shifts in world currency exchanges could stem the foreign competition onslaught.

The current business up-cycle has been a durable and a resilient one, with quarterly growth ranging from 0.6 pct to more than 11 pct. It might yet put on another burst of speed. ☐


New Orders, Durable Goods Producers
Billions of Dollars, Seasonally Adjusted Monthly Averages per Quarters
Plant & Equipment Spending
By Durables Manufacturers
Billions of Dollars Seasonally Adjusted Rates
76
74
72
70
68
1Q 1985
2Q
1Q 1986
*2Q
*3Q
*4Q
*IA Forecast

STEEL

The steel industry is heading into another decline.

Steel shipments will fall by as much as 2 million tons in the third quarter. Steel prices and profits can be expected to fall too.

The outlook isn't good, but there have been a few encouraging developments. Steel imports fell from nearly 2 million tons in March to 1.6 million tons in April.

The April imports were the lowest of the year so far, and steel men think the government's voluntary restraints may finally be starting to work.

Shipments of steel service centers were up 0.8 pct in April. Shipments of domestic mills were probably up about 100,000 tons in the month.

Apart from these direct indicators, the general economic reports were favorable. The National Assn. of Purchasing Management reported a strong May increase in activity. Orders for new freight cars rose from 1,252 in March to 1,850 in April.

The overall economy continued to look healthy. The Gross National Product rose at a 3.7 pct rate in the first quarter, and the inflation rate was the lowest in 37 years. Consumer confidence is rising, and home building is brisk.

With all this economic health, the depressed state of the steel industry might seem puzzling. The explanation is that the expansion of the nation's service sector has obscured the contraction of manufacturing. Seventy pct of the nation's employment is now in services and that number is expected to grow to 85 pct in 15 years.

The shift in the economic mix is one reason consumption of steel has fallen from over 110 million tons in 1979 to a current rate of about 90 million tons. The other factor has been the importing of 13 million tons in the form of autos, machinery and other products made of steel.

Indirect implications of the service expansion are profound. There is little popular indignation over tax proposals calculated to reduce capital spending and bring a further contraction of manufacturing.

It's also worth noting that few services are imported. This could be an illusion, but service workers aren't likely to support strong protectionist measures.

The conflicting interests of the producing and consuming sectors show up in the oil market glut. This has been a devastating thing for a wide range of manufacturers. For consumers, reduced oil prices have been a boon.

The effect of the oil field lag showed up when United States Steel Corp. and Armco Inc. announced they were joining their oil field supply and service divisions into a single venture.

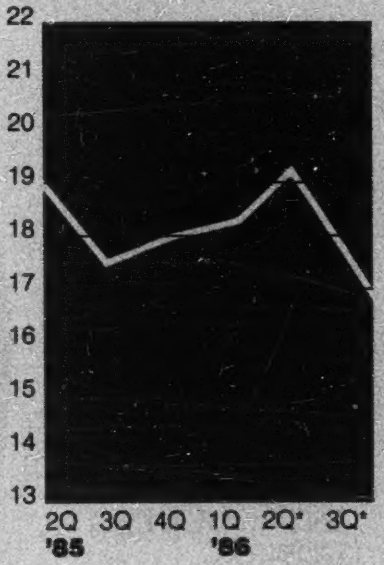
The move reflected "extreme overcapacity in the oil service business." Conditions are so bad that both Japanese and European mills were barred at one point from accepting new U.S. orders for tubular products.

All this is particularly painful to domestic mills because they have been in the process of securing wage concessions from United Steelworkers of America. The tentative agreement of Bethlehem Steel Corp. called for a reduction of $2.35 an hour in labor costs.

LTV Steel and National Steel Corp. earlier reached agreements that lowered employment costs. As it stands, however, any benefits from these agreements may be passed on to customers in the form of price reductions.

Steel shipments will fall by as much as 2 million tons in the third quarter.

Steel Shipments
In Millions of Tons



Source: AISI
*IA estimate

NONFERROUS

Nonferrous metals prices began edging upward as the second quarter drew to a close, raising the possibility that the producers finally are moving into a position to cut themselves in for a bit of the post-1983 business recovery.

Labor strikes helped firm sentiment on the aluminum and copper markets, but the modest uptrend also was evident in zinc and lead and—to a lesser extent—in nickel and molybdenum.

Shipment and consumption levels generally continued to be firm, albeit with no surprises. And while producers weren't overburdened with surpluses, there weren't any shortages either.

Aluminum market sources were expecting the strike at Aluminum Co. of America's domestic facilities could generate more of a pinch in rolled aluminum than in ingot. Alcoa has been downplaying ingot business for months and late last year scheduled a permanent shutdown of 350,000 metric tons of annual domestic capacity for some time in 1986.

Free market ingot prices wobbled up about 2¢ a lb in the first week of the Alcoa walkout.

Domestic primary aluminum production on the eve of the Alcoa strike was running about 5 pct higher than the end-1985 rate, but was well below year-earlier levels. Going into May, production was nearly 12 pct under the same 1985 period. Industry stocks were heading lower, but at a slower rate than primary production.

Import volume this year has been sharply higher for ingot and scrap, while mill product imports (except for aluminum can stock) have been about on par with 1985. A lot of the increase in ingot imports can be tied to foreign units of the U.S. producers.

Free world primary ingot production was down about 1.7 pct in the first third of the year, thanks mainly to lower U.S. and Japanese production.

The key to short-term price movements appeared to center on the length of the Alcoa strike, with downside movement limited by the gradually tightening producer ingot inventory and upside movement limited by idle capacity that could be reactivated.

Copper prices began edging higher as the second quarter drew to a close. By mid-June, they were back to where they were at the start of the year and poised for movement to new ground. The strike at Noranda's copper and zinc operations nudged hedge market values higher. Consumers had been running on maintenance inventories for some time and there was a degree of nervousness about the approaching June 30 deadline on wage negotiations at several U.S. copper units.

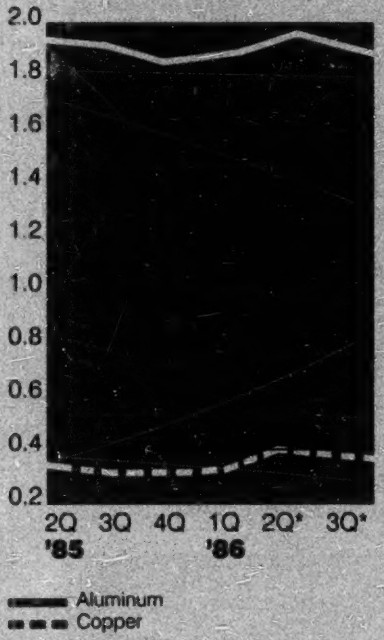
Unlike the aluminum industry, the copper industry often has a major strike before new wage pacts are negotiated.

Zinc prices were showing signs of strength even before the Noranda strike, reflecting fairly strong offtake and a tight rein on production, particularly abroad.

Free market nickel prices began edging upward in early June as the starting date for tandem production and vacation shutdowns scheduled by Inco, Ltd. neared. Metal still was freely available, a situation which held a lid on London Metal Exchange values in the first half of the year as the LME nickel stock climbed by about 18 pct from the end-1985 level. If projected demand levels hold, the Inco cutbacks could start firming prices in the second half.

Labor strikes helped firm sentiment on the aluminum and copper markets.

Nonferrous Metals Shipments
In Millions of Short Tons

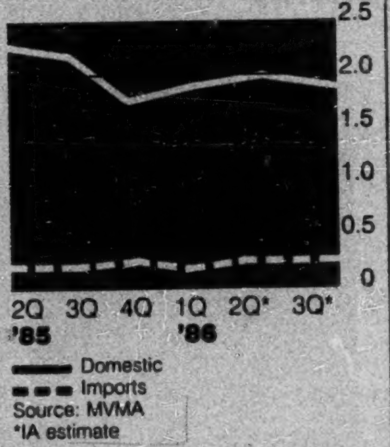


Source: American Bureau of Metal Statistics, Aluminum Assn.
*IA estimate

AUTOMOTIVE; HEAVY EQUIPMENT

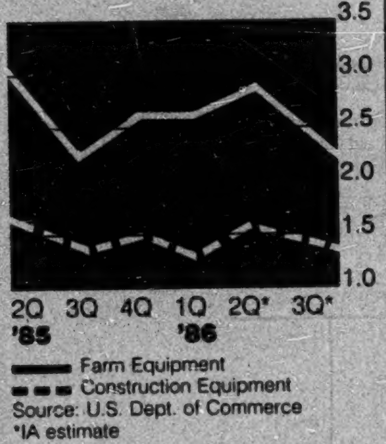
U.S. automakers expect to sell 1.9 million cars in the third quarter.

Automotive Sales
In Millions of Units



Source: MVMA
*IA estimate

Heavy Equipment Shipments
In Billions of Dollars



Source: U.S. Dept. of Commerce
*IA estimate

AUTOMOTIVE – U.S. automakers expect to sell 1.9 million cars in the third quarter. That's 300,000 units fewer than in the third quarter of last year, when sales were inflated by the beginning of customer incentives.

Automakers expect sales of imported cars to total 800,000 units in the third quarter, compared with 700,000 in the same period last year.

U.S. automakers produced about 2.17 million cars but sold only 2 million units in the second quarter. That has swollen inventories. To cut dealer stocks, automakers have had to cut production. In the third quarter, they expect to build 1.8 million cars.

Conditions are ideal for selling cars. Consumer confidence remains high, gas prices low and interest rates are lower than they have been in several years.

The yen has strengthened by more than 30 pct since September 1985. But the stronger yen has increased the price of Japanese cars by only 2-3 pct, estimates the sales analyst at one Big 3 automaker.

"Japanese car prices are 10 pct higher in 1986 than in 1985," explained the analyst. "But all car prices rise 3-4 pct each year anyway.

"Dealers used to mark up Japanese cars 10 pct over the sticker price. Now they're marking them up by 5-6 pct."

Particularly frustrating to U.S. automakers is the continued growth of import sales at their expense though the domestic cars cost less. American cars are available for about $2,500 less than the imports, says one analyst. But Americans still perceive foreign cars as better quality – and worth the higher prices.

HEAVY EQUIPMENT – Farm equipment manufacturers expect to ship about $2.2 billion in units in the third quarter. That's slightly less than the $2.3 billion of equipment they shipped in the third quarter of 1985.

Construction-equipment makers, meanwhile, expect to ship $1.4 billion in units in the third quarter – the same as in the third quarter last year.

Current inventories of farm equipment are high. Dealers have about a year's worth of goods; six to eight months' is considered optimum.

The government buyout of dairy herds is depressing sales of the tractors that farmers use to move their animals' feed and waste. Sales of tractors from 40 to 100 horsepower will drop about 7 pct in 1986 from 1985, estimates the economist of one leading farm- and construction-equipment firm. Sales in that segment were expected to rise this year – until the government began the buyout.

Economists expect sales of tractors under 40 hp to rise by 2-3 pct this year; and those over 100 hp, to decline by 5-10 pct.

In the construction industry, multi-unit nonresidential and housing starts continue strong. "Companies have an incentive to construct more buildings before the tax laws change," explained one economist. The proposed tax laws would reduce depreciation write-offs.

Versatile equipment such as back hoes and excavators should sell well in the third quarter. Crawlers and other equipment used for big projects will sell poorly. That's because government contracts for such projects as sewer and water systems are scarcer in 1986.

MACHINE TOOLS; FLUID POWER

MACHINE TOOLS–The outlook for the immediate future of most of the U.S. machine tool builders is still rather grim despite the broad upturn of the economy. Past forecasts, considered overly pessimistic, are proving to have been conservative.

The picture in this case is incomplete because it reflects primarily the sales of the domestic builders that are members of the National Machine Tool Builders' Association. One industry expert commented that there are about 500 independent machine tool builders in the U.S., but only five of the builders account for nearly 40 pct of the U.S. output.

Iron Age's projections on sales indicates that there may be fewer than 500 U.S. builders in the near future. The ten or twelve leading builders do not appear to be having difficulties, so the projected fall-off in sales will come out of the pockets of the smaller independent builders who can least afford it.

Sales in the third quarter of 1986 are expected to be slow this year because the quarter includes the annual summer slump in machine tool sales as well as the International Machine Tool Show (IMTS) to be held in Chicago, September 3-11.

Sales managers do not accept that as an excuse for not selling, but it is a fact of life. The trend to more regional shows may detract enough from the grand design of the big international shows and thereby lessen the economic impact of the well-established bi-annual introductions of new machines and accessories.

At the end of the second quarter, annual sales for metal cutting and forming machines are projected to decline 6 pct from 1985.

FLUID POWER–Mixed signals best describes the outlook for the fluid power industry at the half way point in 1986.

Reflecting the downturn in many of the nation's capital goods manufacturing businesses, the fluid power industry projects a slowing of its hydraulic sector. Construction equipment, farm machinery, oil field machinery, and machine tools, all heavy users of hydraulic power and control systems, are still down.

On the brighter side, pneumatic systems are doing considerably better. Year-to-year comparisons show that pneumatics grew at a rate of 5 pct, in constant dollars, in 1985, while hydraulic systems sales grew at the rate of 1.8 pct.

This put the average growth range between 2.5 and 2.8 pct while general industrial growth was about 2.1 pct.

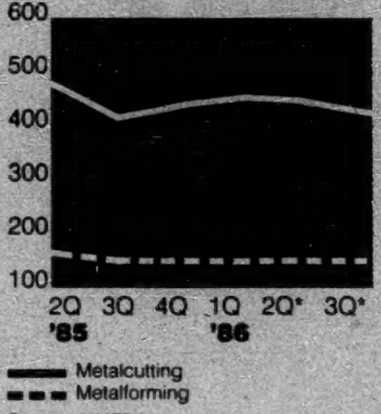
Economic forecasters foresee some growth as the third quarter, begins, with greater growth (but not much greater) in the second half than was experienced in the first half.

For many manufacturing businesses, the nation-wide recovery never seemed to happen as they witnessed solid growth in the service sector, which does not use their products. The traditional capital goods industries are still below their 1979 peaks.

Imports have not yet had any significant direct impact on the fluid power industry. Some fluid power products are being imported in greater numbers at a time when exports of U.S.-produced products are declining. However, it is the indirect imports of finished capital equipment that hurts the most; they are killing off the U.S. manufacturing base that buys fluid power products.

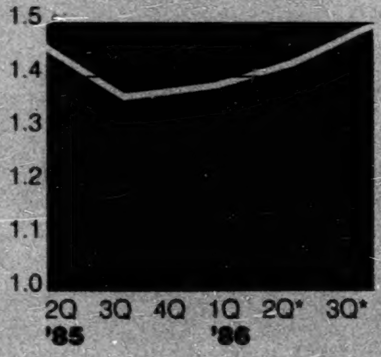
Sales (of machine tools) in the third quarter of 1986 are expected to be slow.

Machine Tools
Net New Orders
In Millions of Dollars



Source: NMTBA
*IA estimate

Fluid Power, Shipments
In Billions of Dollars



Source: U.S. Dept. of Commerce and NFPA
*IA estimate

COATINGS; PLASTICS

COATINGS–Industrial-coatings companies expect to ship about 83 million gallons of products in the third quarter. That's slightly above the 82 million gallons they shipped in the third quarter last year.

The auto industry, the largest single user of coatings, probably will sell 1.9 million cars in the third quarter–300,000 fewer than in the third quarter last year. The automakers and many other users of coatings usually shut down their plants for several weeks in the summer.

This year the auto industry is beginning a major transition from Zincrometal and other zinc-rich primed steels to electrogalvanized steel. Five new electrogalvanizing lines began operation in the U.S. in the first half of this year.

That will have a major impact on coil coaters. Over the past several years, Zincrometal-type paints have been the largest single segment of coated coil's sales. One-quarter of coated coil has gone to this market.

But coated coil is making continued inroads into the building and appliance industries. Container and packaging companies plan to use more coil, too.

"Metal office furniture and wooden furniture have been excellent markets so far this year and should continue to be good in the third quarter," said a vice president at one major Midwestern coater. Low interest rates are aiding the steady growth in residential and industrial construction.

Coil coaters say they're shipping more products for use in new buildings than last year. Appliances remain a growing market.

The market for coatings on business machines, on the other hand, has plummeted.

PLASTICS–Anticipation of lower resin prices arising from sliding oil prices and lower energy costs generally slowed resin purchases in the opening months of 1986. Some major consumers reportedly were buying only to meet minimum requirements as they watched hydrocarbon feedstock costs come down and pressed their suppliers for pass-throughs.

Producer efforts to nudge prices higher failed early in the second quarter, particularly for high density polyethylene and both low density and linear low density polyethylene. In some cases, this was followed by a spate of discounting.

Downward pressure on styrene and polystyrene developed after benzene and ethylene prices dropped and a late second quarter effort to raise prices on pipe grade PVC resin didn't have much luck, either. Some fabricators of PVC pipe had curbed production in order to bring their own inventories into line.

Popular forecasts for shipments of the six key thermoplastic grades still point upward, although at a slower rate than 1985. A notable exception is ABS, which is slated for a 4 pct gain this year that would recover most of the ground lost in 1985 when shipments were down 7.5 pct.

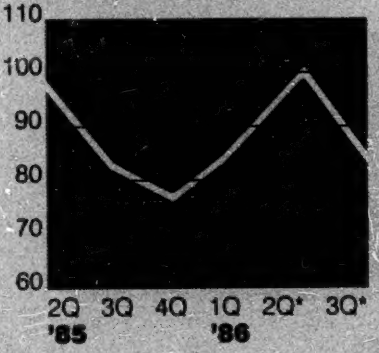
PVC likewise is projected to rise 3.5 pct this year after a 1.2 pct drop in 1985.

In the aggregate, the projections for the big six point to a 4.5 pct shipment gain this year compared with the 5.3 pct gain registered in 1985.

Early forecasts for 1987 are larger increases across the board, but they are based on a bigger gain in real GNP for the most part.

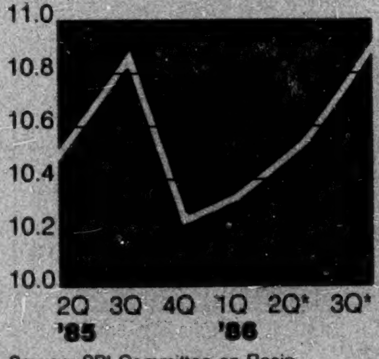
Coated coil is making inroads into the building and appliance industries.

Industrial Coatings Shipments
In Millions of Gallons



Source: U.S. Dept. of Commerce
*IA estimate

Plastic Resins Sales & Captive Use
In Billions of Lbs

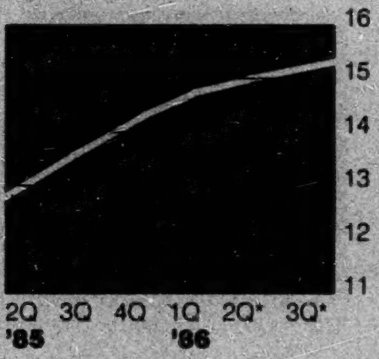


Source: SPI Committee on Resin Statistics as complied by Ernest & Whinney
*IA estimate

COMPUTERS; INSTRUMENTS & CONTROLS

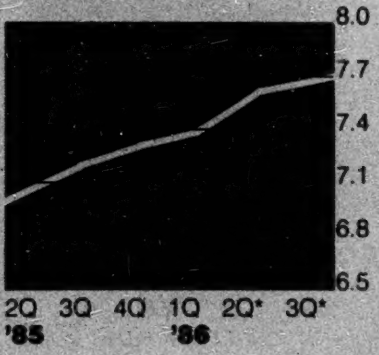
For the third quarter, a 2 pct growth in computer sales is expected.

Computers Shipments
In Billions of Dollars



Source: U.S. Dept. of Commerce
*IA estimate

Instruments & Controls Shipments
In Billions of Dollars



Source: U.S. Dept. of Commerce
*IA estimate

COMPUTERS—Like the flu, the slump the computer industry suffered through last year appears to be lingering on. Expectations were that the second quarter would bring on recovery, but many companies supplying computer equipment are still under the weather.

Computers are no longer a technology that companies must have come hell or high water. For better or worse, computer purchases now are receiving the same scrutiny as other capital equipment purchases. Consequently, computers are subject to the same business cycles that affect spending for other capital goods. Right now that cycle is taking a nose dive.

Capital spending has slowed through the past two years, but never more than now. Capital outlays dropped 14 pct through the first quarter of this year and continued falling in the second quarter. Computers now represent a major portion of the capital equipment in many companies, so drops in capital spending have blunted expected computer growth.

For the third quarter, a 2 pct growth in computer equipment sales is expected. Little evidence exists that orders will perk up this quarter. However, fourth quarter sales could see some improvement as delayed orders finally are processed.

As with other capital equipment, today's management is seeking ways to use available computers more wisely instead of rushing out to embrace the newest computer technology, as was done in the past. Integration—linking isolated computers—is drawing increasing interest as a way to squeeze more out of available technology.

INSTRUMENTS & CONTROLS—Though still not moving rapidly, sales of instruments and controls picked up steam through the first two quarters of 1986. This slow progress will continue in the third and fourth quarters.

First quarter sales rose 1 pct over the fourth quarter 1985 total, and it appears that second quarter sales have topped the first by 1.8 pct. The third quarter should outpace the second by 1.2 pct.

At first glance it would appear that sales of measuring and controlling instruments should be on a down slope.

Capital spending, one benchmark of the industry's demand, has been weak. Likewise, manufacturing capacity utilization, another indicator of the need for instruments and controls, has fallen below 80 pct.

On the positive side, nearly one-quarter of U.S.-made instruments and controls are exported. And the declining value of the dollar against other currencies is helping U.S. products become more competitive overseas.

R&D spending, especially by defense-related industries, remains high. R&D programs are heavy users of instruments. Federal funds targeted for R&D reached $51 billion in 1985 and could top $60 billion in 1986.

Also, the housing boom remains in high gear. The appliance industry, which has benefited from that activity, uses instruments to control a variety of functions on their products.

Sales of flaw detection and mechanical testing equipment are on the upswing, as are the sales of aircraft engine instruments due to increased production by both the military and commercial aircraft producers.

APPLIANCES; MATERIAL HANDLING

APPLIANCES—This is one forecast that could make one nervous because each quarter seems to outperform the previous one. While the boom won't last forever, it still appears to be on solid ground and gaining strength.

According to the Association of Home Appliance Manufacturers (AHAM), the major appliance industry shipped over 10.2 million units in the first quarter of 1986, and continued the hot pace with shipments of over 3.7 million units in April. Projections now call for a near-record shipment of 41.4 million units for the year, which is up significantly from forecasts made in 1985. The record sales figure set in 1985 was 41.8 million units.

Continued strength in the sales of new homes and updating older homes' appliances are behind the remarkable performance of the appliance industry. Mortgage rates are relatively low and incomes are rising. Employment is up and so is income. Consumer confidence levels are optimistic.

Sales of different appliances have been taking some wild gyrations in the month-by-month reporting figures. The association issued a caution concerning the data on monthly shipments of microwave ovens, which dropped 22.3 pct in March. Apparently in 1985 there was a delay in reporting figures which raised the 1985 shipment figure and artificially depressed the 1986/1985 figure.

Moderate weather was also blamed for depressing the sales of home comfort appliances during the first quarter and into April.

Looking ahead, AHAM is forecasting sales in 1987 to be about 41.1 million units, with shipment gains in all products except home comfort appliances.

MATERIAL HANDLING—Growth goes on, for the material handling industry, particularly for the hi-tech systems sector.

One industry executive says the steady, though slower pace of the economic recovery will continue to be reflected in both bookings and shipments of equipment.

He estimates that second quarter 1986 bookings will turn out 15 to 17 pct higher than those in the same quarter of last year. For shipments, he figures a 20 to 22 pct jump in the period.

Another sees a further rise in the third quarter—more modest—but still in double-digits.

But a Midwestern manufacturer feels less optimistic about his third quarter sales. He makes conveyors and cranes and, despite the continuing U.S. urge to hype productivity, he thinks his sales will rise only by 5 to 6 pct.

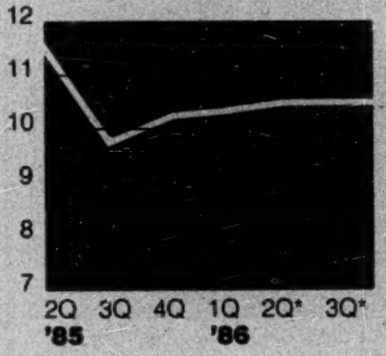
At the other end of the spectrum—those making pallets, for one—business continues to be blunted. Here, the ability to stay afloat, against low profit margins, is often a matter of providing replacement parts. And fork lift truck makers still face stiff overseas competition, despite the weaker dollar.

But the automated storage and retrieval systems makers report strong backlogs, with electronics, food, beverage and automotive customers continuing to clamor for the latest in hi-tech systems. On the other hand, there has been some stalling in getting automated installations working.

One Midwestern manufacturer complained that his systems sales have not been moving as "briskly" as predicted, largely because some companies lack the expertise needed to integrate the new systems into their plants.

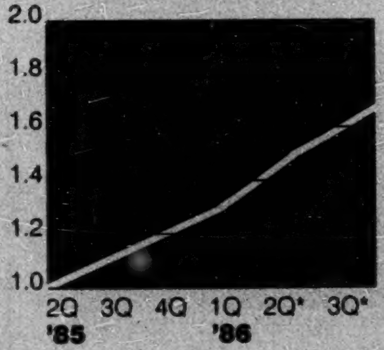
Projections now call for a near-record shipment of appliances for the year.

Appliances, Shipments
In Millions of Units



Source: AHAM
*IA estimate

Material Handling Shipments
In Billions of Dollars

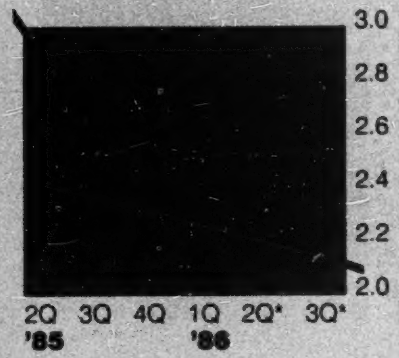


Source: Material Handling Institute
*IA estimate

CASTINGS; FORGINGS

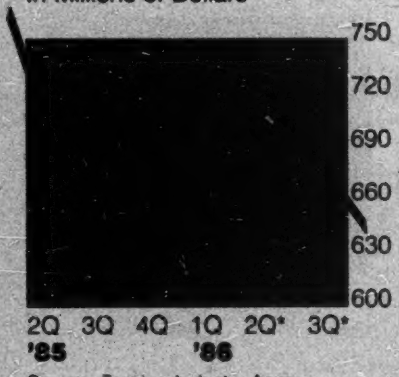
For the foundry industry, the third quarter shows little hope of improvement.

Ferrous Castings Shipments
In Millions of Tons



Source: U.S. Dept. of Commerce
*IA estimate

Impression Die Forgings Shipments
In Millions of Dollars



Source: Forging Industry Assn.
*IA estimate

CASTINGS—If you examine the statistics compiled by the U.S. Dept. of Commerce on ferrous castings, you would be convinced that the U.S. foundry industry had its worst quarter in history from January through March, 1986. There are a number of iron foundries that will dispute those figures. But most of the dissenters are suppliers to the auto industry, which is doing well.

All told, however, the markets for gray, ductile and steel castings did not fare well in the first quarter and do not seem to be doing any better in the second quarter of 1986. The third quarter shows little hope of improving. Only malleable iron castings are showing signs of improvement.

Shipments of ferrous castings dropped 8 pct from the fourth quarter 1985 to the first quarter 1986, but the drop was horrendous from last year's first quarter to this year's. The decrease was 770,000 tons or 33 pct. We are predicting slightly better second and third quarters but certainly no return to 1985 shipments.

Foundrymen note that there are no new business opportunities out there, and that survival is left up to hard work. In other words, one foundry is taking business away from another foundry. There are reports of price cutting here and there. Even in those foundries that are doing well, executives admit that the overall market for ferrous castings is shrinking.

In the auto industry where business is good, there is that fear that the producers of ferrous castings will soon be entering their biggest battle, the war with aluminum castings. In automobiles, at least, it is a battle that the iron foundries may not win.

FORGINGS—Through the first half of 1986, sales of impression die forgings ran close to expectations.

Late last year, the Forging Industry Assn. predicted that 1986 sales would match 1985 totals. By May, orders were running 1 pct above 1985 levels. Last year was not a good one for the industry, so the best that can be said is that at least 1986 is no worse.

The industry is suffering from a depressed U.S. marketplace and increased competition from abroad. Much of its traditional business—from farm equipment and oil field goods manufacturers, for example—has dried up. At the same time, imported forgings are flooding the U.S., both as raw forgings and as parts within finished goods.

The third quarter should see a decline in orders due to usual summer slowdowns and to a falloff in automobile production. Heavy forging purchases from car and truck manufacturers has been one of the few bright spots for the impression die forging industry over the past two years. Car production, though still strong, is down from last year. Due to over-production in the second quarter and expected increase in import sales in the U.S., auto companies are planning to cut back production—from almost 2.2 million to 1.8 million cars in the third quarter.

If auto production is cooling, aerospace and aircraft production remains hot. Due to the large number of orders for commercial aircraft last year, backlogs will be strong throughout 1986. Military business also remains strong, although growth could be slowing due to pressures to reduce military spending.

WELDING; HEAT TREATMENT

WELDING – Flat may be the best word to describe conditions in the welding industry. There are some strong market segments here and there, like automotive and aerospace, but for the most part, business is slow.

According to welding equipment makers, the first and second quarters of this year are a continuation of the lackluster performance reported for the fourth quarter of 1985.

Sales in this year's second quarter, they add, are down slightly from the same quarter of last year.

Unless something unexpected happens, the third quarter is not likely to be any better.

The weak user industries, such as off-highway construction and oil country, remain weak, but there are a few bright spots. One is the aerospace engine repair business. Another minor prospect is nuclear repair.

The welding distributors, however, are telling another story. The welding supply index compiled by the National Welding Supply Association, Philadelphia, was the highest ever (216.9) in April.

Likewise, the NWSA index for shielding gases (261.3) surpassed the previous high, set this January. The index for filler metals also hit a new high, wiping out the previous record from April 1985.

Again, referring to the NWSA statistics, the first quarter of 1986 posted a 4.5 pct improvement over the same period of last year and a 2.9 pct increase over the fourth quarter of 1985. *Iron Age* estimates that welding distributor shipments will climb another 5 pct in the second quarter, then up again just a fraction of a percent in the third quarter.

HEAT TREATMENT – The commercial heat treaters are holding their own. Unfortunately, the same cannot be said for the makers of heat processing equipment.

The commercial heat treaters billings in the first quarter dipped $4.4 million from the fourth quarter but were up $3.4 million from the same period a year earlier.

The rebound continued in the second quarter for commercial heat treaters, but a seasonal dip is expected to weaken the third quarter slightly. One heat treater is cautiously optimistic about the rest of the year and notes that September will be the key month.

Geographically, Detroit, the East, Southeast and the West Coast are all busy areas. Weak are the Midwest and Southwest.

Automotive, aerospace, aircraft and defense are all good, but oil field equipment, once a major market for commercial heat treaters, "is just plain terrible."

Over on the heat processing equipment side, orders plummeted about $30 million, or more than 32 pct from the first quarter of 1985 to the first quarter of this year. By comparison, the drop between the fourth quarter of 1985 to the first quarter of 1986 was only about $7^1/_2$ pct.

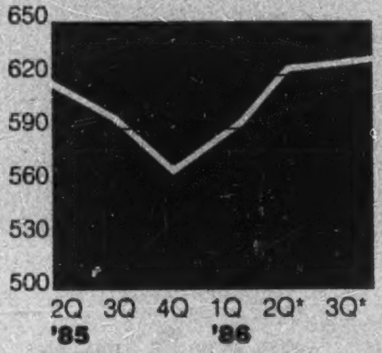
One executive of a heat processing equipment company sees the second quarter showing some improvement over the first quarter, then a third quarter resembling the first quarter of 1986.

"We had been getting orders from the defense industry," he said, "but even that business seems to be tapering off."

Both heat treaters and the builders of heat processing equipment are concerned that strikes will have an impact on third quarter business in some key markets.

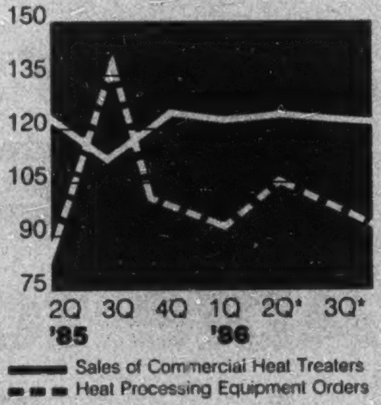
There are some strong segments in the welding market, but for the most part, business is slow.

Welding Shipments



Index 100 = $200 million in distributor sales
Source: National Welding Supply Assn.
*IA estimate

Heat Treatment
In Millions of Dollars

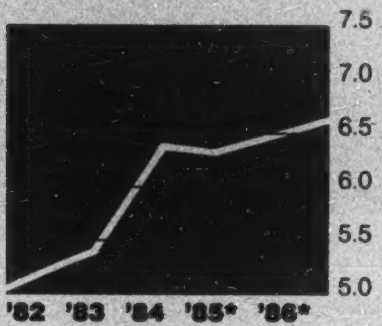


Source: Industrial Heating Equipment Assn., Metal Treating Institute
*IA estimate

STAMPINGS; FASTENERS

Autos, the stamping industry's largest market, probably will fall short of the second-quarter mark.

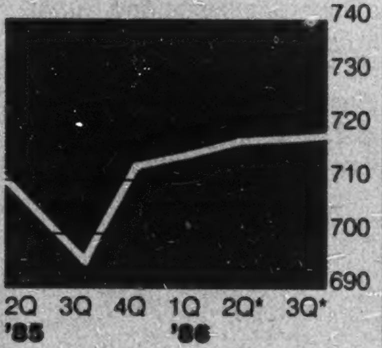
Stampings Shipments
In Millions of Dollars



Based on the average of a control group whose shipments total more than $500 million annually.

Source: American Metal Stamping Assn.
*IA estimate

Fasteners, Sales
In Millions of Dollars



Source: Industrial Fasteners Institute
*IA estimate

STAMPINGS—Look for consumers to continue their spending spree through the upcoming third quarter, to the pleasure of the stamping industry.

Orders for the year-to-date stand 3 pct higher than the same period of last year.

Shipments, meanwhile, rose 11 pct in April compared with March 1986, and were up 9 pct this April vs. last April. Industry backlogs through April were off 1 pct from year-ago rolling averages.

Industry officials expect orders and shipments to plateau at these increases in this quarter.

Demand from the automakers, the stamping industry's largest market, probably will fall short of the second-quarter mark, despite cheaper financing and gasoline.

A Midwestern stamper noted the upsurge in recreational vehicle sales.

Stamping orders from computer manufacturers continue to tail off, industry members say, but the medical equipment market remains busy.

The boom in housing construction has spurred appliance sales and the consequent demand for stampings from the appliance makers. Interestingly, the active housing market has also accelerated the moving truck business, building demand for new and revamped truck fleets.

Stamper complaints? One in the East grumbled about a low tide in cash flow and a "pervasive paucity" of capital funds.

On the other hand, an executive at a Midwestern precision stamping firm, supplying automotive, construction, electronics and appliance markets, said his firm is expanding its manufacturing, anticipating a continuing "strong growth trend."

FASTENERS—The fastener industry may not be shooting off fireworks this July Fourth, but those who make custom-formed parts may be lighting a Roman Candle or two.

One such executive reported his first quarter 1986 orders were about 14 pct higher than first quarter of last year, and he anticipated another 7 to 8 pct order increase from the first to the second quarter of this year.

Aerospace is his trump card, so he probably won't be disappointed, despite the depressed states of the oil country, energy and farm equipment markets.

Another specialty fastener maker sees his third quarter orders as "more or less" holding the pattern of the second quarter.

A Midwestern fastener maker reported some new business from mobile housing, mostly for temporary dwellings in devastated areas, and the earlier pickup in sales of RVs was noted, which has sparked some demand for engineered fasteners.

That's the good news.

The bad news is that there is still no good news about "standards"—bolts, screw, washers or rivets.

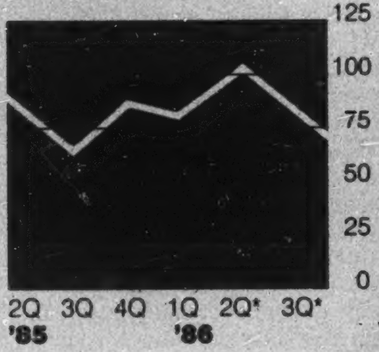
Imports from Japan, South Korea, Taiwan and Germany continue to pour into the U.S. in record amounts, and increasing the dropout rate among mechanical fastener manufacturers.

But in any group there's always at least one iconoclast. Last September, one company said it was finishing a $25 million facility in order to begin producing steel fasteners and expected to be in peak production of 40,000 tons a year by late 1987. It intends to buck the tide of imports with automation.

AIRCRAFT

The outlook for the aircraft companies looks better in the commercial sector.

Commercial Airplane Deliveries
No. of Planes



Source: Airbus Industrie, Boeing and McDonnell-Douglas
*IA estimate

The outlook for the aircraft companies looks a lot better in the commercial sector than it does on the military side, where Gramm-Rudman and revived Pentagon interest in expenditure control are holding the lid down.

The trend line points downward for military aircraft from the $23 billion spent in fiscal 1985 to fiscal 1987's budgeted $17.5 billion.

Meanwhile, the commercial jet aircraft business should continue to percolate. As had been expected, the incoming order rate dipped in the first quarter to 135 from the spectacular 257 registered for the final 1985 period. However, first quarter orders were still well ahead of deliveries, which at 80 jetliners were a bit slower than had been anticipated. This just added to an already comfortable backlog that had jumped nearly 43 pct in 1985.

Early projections of deliveries by Boeing, McDonnell-Douglas and Airbus in 1986 range between 339 and 346 (the difference reflecting varying estimates for Boeing ranging between 233 and 240), compared with the 313 jetliners delivered in 1985.

The general aviation sector got off to a slow start in 1986. Jet shipments fell to 16 in the first quarter from 30 in the same 1985 period and first quarter deliveries of turboprops plummeted to 33 from 73 in the same 1985 period.

For information, Circle 1

PRICE & PRODUCTION DATA

(Effective June 16,1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	172	185	184	186
Pittsburgh	213	221	241	231
Youngstown	97	97	105	80
Lake Erie	92	95	163	141
Detroit	148	122	149	162
Chicago	407	404	509	492
Midwest	178	171	170	171
Southern	189	200	205	235
Western	83	82	88	99
U.S. Production	1,579	1,577	1,814	1,799

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8/13/85. **59.4¢—Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢—U.S. Steel as of 8/16/85. 86.9¢—Oglebay No.ton 3/25/82; Hanna Mining and Cleveland-Cliffs, 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective June 16,1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,579	1,577	41,424	40,844
Capability Utilization Rate	63.8	63.8	70.7	67.2

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 5/19/86)	24.850	24.850	24.607	27.582
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 70.83	$ 70.83	$ 73.17	$ 66.17
No. 2 bundles	$ 51.50	$ 51.50	$ 52.83	$ 47.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 69.50	$ 69.50	$ 73.50	$ 70.50
No. 1 steel, Philadelphia	71.50	71.50	71.50	66.50
No. 1 steel, Chicago	71.50	71.50	74.50	61.50
No. 1 bundles, Detroit	57.50	57.50	62.50	59.50
Low Phos., Youngstown	68.50	68.50	73.50	57.50
No. 1 mach'y cast., Pgh	73.50	73.50	73.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	91.50
No. 1 mach'y cast., Chi	105.50	105.50	109.50	99.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Compos[illegible]: [illegible]ased on average prices for basic and foundry pig iron at representative producing points within [illegible] U.S.

***Steel Scrap Co[illegible]site: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective June 16, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	54.38	54.33	6/16/86
Copper (C)	67.00-69.00	67.50-69.00	6/10/86
Lead	23.00	22.50-23.00	6/16/86
Magnesium Ingot	153.00	148.00	12/ 9/85
Nickel (LME)	187.84	182.81	6/16/86
Zinc	38.00-41.00	38.00	6/12/86

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$339.55
Indium, dollars per troy oz.	$2.65
Iridium, dollars per troy oz.	$420.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$270.00-285.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.25
Palladium, per troy oz.	$112.00
Platinum, per troy oz.	$421.00
Rhodium, per troy oz.	$1,160.00
Silve[illegible]gots, per troy oz.	$5.105
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

June 9—Holiday
June 10—Holiday
June 11—245.19
June 12—245.51
June 13—247.27

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	62	53½
Yellow brass	52½	46½
Red brass	57	49
Comm. bronze	58½	50
Mang. bronze	42¼	41¼
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	58
No. 2 copper wire	50
Light copper	41

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	54
No. 2 copper wire	46
Light copper	37
No. 1 composition	46
No. 1 comp. turnings	45
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	26
Radiators	34

Aluminum

New mixed clips	32	— 33
Old sheet	29	— 30
Old cast	29	— 30
Clean dry borings	30	— 31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	28	— 29
Mixed L.C. clips	26	— 27
Old sheets and cast	24	— 25
Borings and turnings	20	— 21
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	48	— 49
No. 2 copper wire	39	— 40
Light copper	33	— 34
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	35	— 36
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 16
Old diecast zinc	11	— 12

EFFECTIVE JUNE 16,1986

(Effective June 16, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	83.00 to	84.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	80.00 to	81.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	42.00 to	43.00
Low phos. punchings plate	99.00 to	100.00
Heavy turnings	59.00 to	60.00
No. 1 RR hvy. melting	80.00 to	81.00
Rails, 2 ft. and under	93.00 to	94.00
Scrap rails, random lgth	78.00 to	79.00
RR specialties	93.00 to	94.00
No. 1 machinery cast	73.00 to	74.00
Cupola cast	66.00 to	67.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	520.00 to	530.00
18-8 turnings	420.00 to	430.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	67.00 to	68.00
No. 1 dealer bundles	82.00 to	83.00
No. 1 factory bundles (auto)	78.00 to	79.00
No. 2 dealer bundles	56.00 to	57.00
No. 1 busheling	77.00 to	78.00
Shredder scrap	77.00 to	78.00
Machine shop turnings	27.00 to	28.00
Mixed borings and turnings	22.00 to	23.00
Shoveling turnings	29.00 to	30.00
Cast iron borings	41.00 to	42.00
Low phos. forge crop	97.00 to	98.00
Low phos. punchings plate		
1/4 in. and heavier	112.00 to	113.00
Low phos. 2 ft. and under	106.00 to	107.00
No. 1 RR hvy. melting	75.00 to	76.00
Scrap rails random lgth	79.00 to	80.00
Reroller rails	104.00 to	105.00
Rails, 2 ft. and under	99.00 to	100.00
RR couplers and knuckles	90.00 to	91.00
RR car axles	106.00 to	107.00
No. 1 machinery cast	105.00 to	106.00
Cupola cast	92.00 to	93.00
Stove plate	97.00 to	98.00
Steel car wheels	87.00 to	88.00
Stainless		
18-8 bundles and solids	485.00 to	495.00
18-8 turnings	400.00 to	410.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 70.00 to	$ 73.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	50.00 to	53.00
No. 1 busheling	80.00 to	83.00
Shredder scrap	82.00 to	85.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	37.00 to	40.00
Low phos. 5 ft. and under	74.00 to	77.00
Low phos. 2 ft. punchings	93.00 to	96.00
Electric furnace bundles	81.00 to	84.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	94.00 to	97.00
Cupola cast	85.00 to	88.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	46.00 to	47.00
No. 1 dealer bundles	57.00 to	58.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	56.00 to	57.00
Drop forge flashings	38.00 to	39.00
Machine shop turnings	27.00 to	28.00
Mixed borings and turnings	8.00 to	9.00
Shoveling turnings	27.00 to	28.00
Cast iron borings	18.00 to	19.00
Heavy breakable cast	31.00 to	32.00
Mixed cupola cast	46.00 to	47.00
Automobile cast	70.00 to	71.00
Stainless		
18-8 bundles and solids	480.00 to	490.00
18-8 turnings	345.00 to	355.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 dealer bundles	67.00 to	68.00
No. 2 dealer bundles	31.00 to	32.00
Machine shop turnings	19.00 to	20.00
Shoveling turnings	19.00 to	20.00
Low phos. plate	68.00 to	69.00
Electric furnace bundles	57.00 to	58.00
Galvanized bundles	55.00 to	56.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	70.00 to	71.00
No. 1 factory bundles	64.00 to	65.00
No. 2 bundles	29.00 to	30.00
No. 1 busheling	62.00 to	63.00
Machine shop turnings	19.00 to	20.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	17.00 to	18.00
Cut structural & plates,		
5 ft. and under	63.00 to	64.00
Cut structural & plates,		
2 ft. and under	85.00 to	86.00
Low phos. punchings plate	85.00 to	86.00
Foundry steel, 2 ft. & under	51.00 to	52.00
No. 1 RR hvy. melting	57.00 to	58.00
Rails, 2 ft. and under	86.00 to	87.00
Rails, 18 in. and under	88.00 to	89.00
No. 1 machinery cast	77.00 to	78.00
Mixed cast	44.00 to	45.00
Stainless		
18-8 bundles	480.00 to	490.00
18-8 turnings	350.00 to	360.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	40.00 to	41.00
No. 1 busheling	66.00 to	67.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	13.00 to	14.00
Mixed boring and turnings	13.00 to	14.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	23.00 to	24.00
Low phos. plate	74.00 to	75.00
Structural and plate,		
2 ft. and under	75.00 to	76.00
Rails, 2 ft. and under	75.00 to	76.00
Scrap rails, random lgth	61.00 to	62.00
No. 1 machinery cast	74.00 to	75.00
No. 1 cupola cast	71.00 to	72.00

St. Louis

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 busheling	79.00 to	80.00
No. 1 dealer bundles	77.00 to	78.00
No. 2 bundles	46.00 to	47.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	27.00 to	28.00
No. 1 RR hvy. melting	73.00 to	74.00
Rails, random length	74.00 to	75.00
Rails, 18 in. and under	97.00 to	98.00
RR specialties	74.00 to	75.00
Cupola cast	69.00 to	70.00
Heavy breakable cast	43.00 to	44.00
Stove plate	89.00 to	90.00
Steel car wheels	78.00 to	79.00
Rerolling rails	99.00 to	100.00
Unstripped motor block	54.00 to	55.00

Birmingham

No. 1 hvy. melting	$ 68.00 to	$ 69.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	68.00 to	69.00
No. 2 bundles	44.00 to	45.00
No. 1 busheling	68.00 to	69.00
Shredder scrap	86.00 to	87.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	36.00 to	37.00
Electric furnace bundles	65.00 to	66.00
Elec. furnace, 3 ft. & under	68.00 to	69.00
Structural and plate, 2 ft.	87.00 to	88.00
Structural and plate, 4 ft.	81.00 to	82.00
No. 1 RR hvy. melting	81.00 to	82.00
Scrap rails, random lgth	70.00 to	71.00
Rails, 2 ft. and under	85.00 to	86.00
Angles and splice bars	81.00 to	82.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	72.00 to	73.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	75.00 to	76.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	75.00 to	76.00
No. 1 cupola cast	64.00 to	65.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	68.00 to	69.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	33.00 to	34.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	440.00 to	460.00
18-8 turnings	340.00 to	360.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 51.00
No. 2 hvy. melting	39.00 to	41.00
No. 1 dealer bundles	50.00 to	52.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	56.00 to	58.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	72.00 to	77.00
Mixed cupola cast	44.00 to	46.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	20.00 to	21.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 34.00 to	$ 36.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under		
(foundry)	67.00 to	69.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 76.00
No. 2 hvy. melting, cut 2 ft. and under	67.00
No. 1 dealer bundles	82.00
No. 2 bundles	58.00
Mixed steel scrap	56.00
Bush. new fact. prep'd	77.00
Bush. new fact. unprp'd	60.00
Machine shop turnings	30.00
Short steel turnings	30.00
Mixed borings and turnings	19.00
Cast scrap	92.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 59.00 to	$ 60.00
No. 2 hvy. melting	49.00 to	50.00
No. 2 bundles	33.00 to	34.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	24.00 to	25.00
Shredder scrap	70.00 to	71.00
Cut structural plate, 2 ft. and under	91.00 to	92.00
Cut structural plate, 5 ft. and under	70.00 to	71.00
Unstripped motor blocks	54.00 to	55.00
Cupola cast	81.00 to	82.00

ORDERS SOFTNESS STILL HOLDS

Through most of last year, orders received by durable goods producers were on a treadmill.

This year, through April, the latest month of complete data, the treadmill seems to have kicked into slow reverse.

Orders in April totaled $104.5 billion. This dollar volume was off $200 million from March. And the April dip marked the third straight month of decline. April orders, in inflation-adjusted dollar volume, were off about 5 pct from the volume in the opening month of the year.

Where's the big weakness?

In orders, the product group showing the greatest weakness was office and computing machines (SIC 357). At $13.2 billion, these orders were down 30 pct from the year-ago same four-month period. Another soft spot was in orders for metalworking machinery (SIC 354), which at $3.3 billion, were down 13 pct.

For the product lines that showed the greatest strength in the January-April period, the credit must go to the Pentagon.

Orders for ships and military tanks (SIC 3731,95), at $4.5 billion, were up 142 pct. Aircraft, missiles and parts (SIC 372,6), at $38 billion, were up 38 pct.

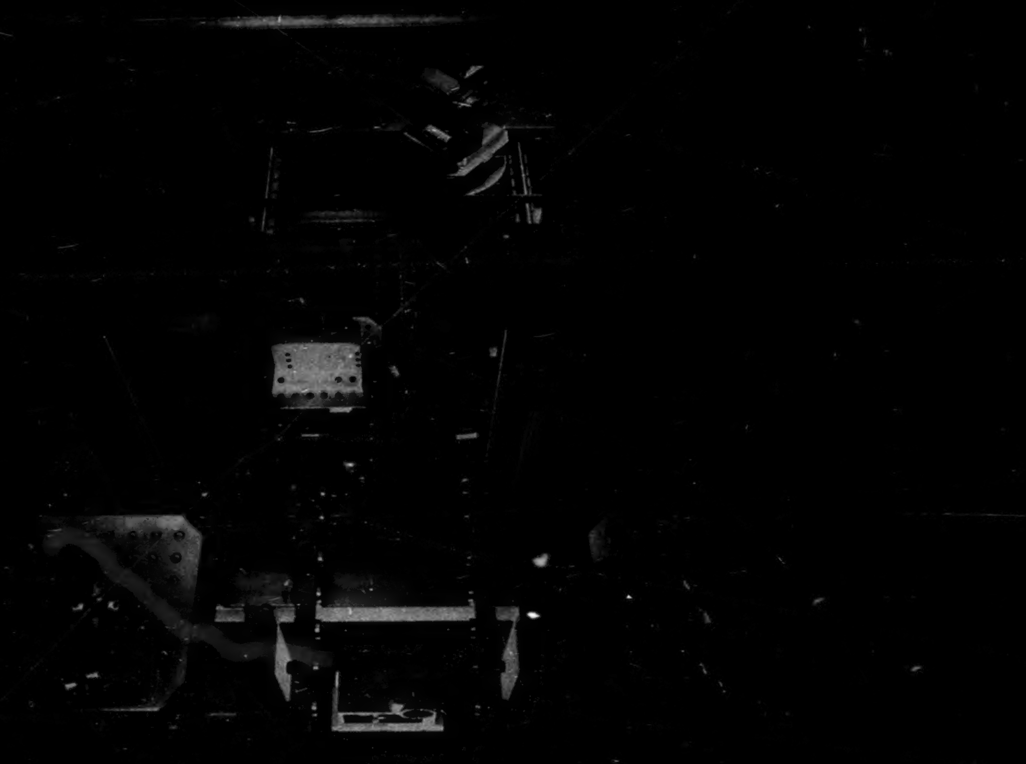
The orders pattern of big gains in some product lines and and big declines in others, resulted in a small increase for total durables orders in the opening four-month period. Total orders came to $432.8 billion and were up 4.2 pct. That would come out to an estimated 2.8 pct gain when adjusted for inflation.

Some executives in durable goods industries are holding out hope that a settling of matters on the tax bill might release a lot of backed-up orders. That remains to be seen.

[illegible]

C2150-YA

FITTING AN FMS INTO THE SMALL PLANT

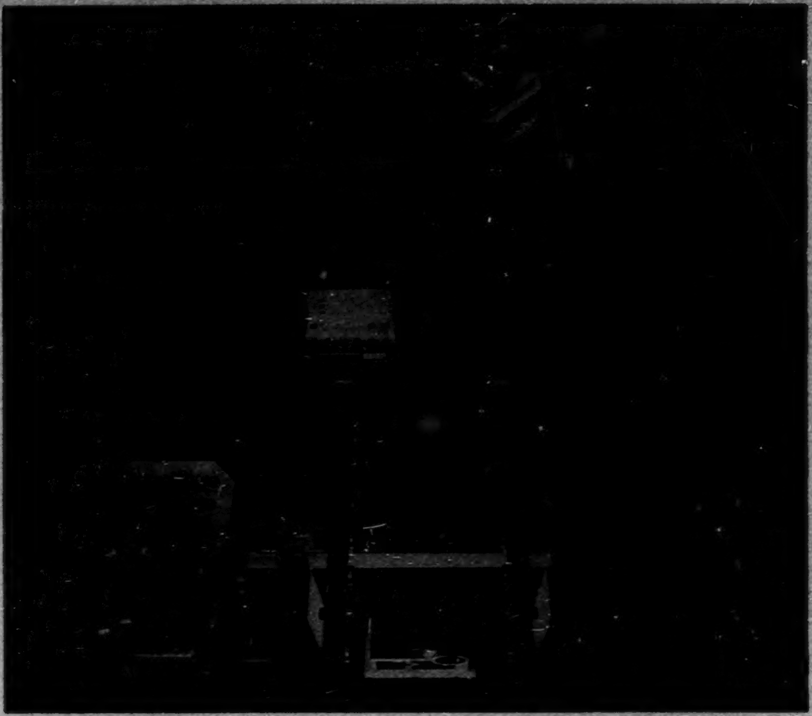


NISSAN IN TENNESSEE:
AMERICAN MANAGERS USE JAPANESE TECHNOLOGY TO BUILD CARS AND TRUCKS

THE TRADE BILL SPARKS A BATTLE BETWEEN REAGAN AND THE CONGRESS

JULY 18, 1986 VOL. 229, NO. 14

IRON AGE
MANUFACTURING MANAGEMENT



Cover Photo courtesy of Maho Machine Tool Corp.

Editorial 7
This gives me the shakes.

Newswatch 11
Machine vision executives foresee growth for their industry.

You and Your Job 19
Careful planning now will help offset the tax reform jolt.

Small Plant FMS 24
Flexible manufacturing can help the small manufacturer.

Nissan 33
An American workforce produces Japanese quality.

Protectionism 43
The trade bill has sparked a battle on Capitol Hill.

Motorola 48
Increased spending on employee education pays off.

East Germany 51
Its CAD/CAM expertise is closing the East/West technology gap.

Technically Speaking 54
Garnet abrasives assist in water jet cutting.

Materials Report 62
Steelmakers wonder about the impact of an economic downturn.

Price Trends 68
Prices firming up? No, not yet.

Next Issue: In Pursuit of Quality—Castings.

Departments

EDITORIAL STAFF 8
LETTERS 8
INDUSTRIAL BRIEFS 18
FREE LITERATURE 56
FYI 58
MANAGEMENT SERVICE CARD 59
AD INDEX 61
BUSINESS STAFF 61
P&P DATA 6/30 64
FERROUS SCRAP 6/16 65
CLEARING HOUSE 66

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year, $85 Canada/Foreign (24 issues). Metalsproducer edition—$30 one year, $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 2040, Radnor, PA. 19089.

Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES

PRICE & PRODUCTION DATA

(Effective June 30,1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	169	168	173	180
Pittsburgh	205	208	232	224
Youngstown	98	104	103	81
Lake Erie	88	82	115	122
Detroit	145	145	157	111
Chicago	408	423	470	467
Midwest	170	168	166	164
Southern	183	175	201	202
Western	84	81	86	90
U.S. Production	1,550	1,554	1,703	1,641

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢—Mineral Services, 8/13/85. **59.4¢—Inland Steel Mining, 1/1/85 and Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢—U.S.Steel, 8/16/85. 86.9¢—Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective June 30,1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,550	1,554	44,528	44,178
Capability Utilization Rate	62.7	62.8	70.1	67.0

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 5/19/86)	24.850	24.850	24.850	27.582
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 71.17	$ 70.83	$ 70.83	$ 67.50
No. 2 bundles	$ 52.17	$ 52.17	$ 51.50	$ 48.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 70.50	$ 69.50	$ 69.50	$ 72.50
No. 1 steel, Philadelphia	71.50	71.50	71.50	68.50
No. 1 steel, Chicago	71.50	71.50	71.50	61.50
No. 1 bundles, Detroit	62.50	57.50	57.50	61.50
Low Phos., Youngstown	71.50	68.50	68.50	57.50
No. 1 mach'y cast., Pgh	74.50	73.50	73.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	91.50
No. 1 mach'y cast., Chi	105.50	105.50	105.50	99.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective June 30,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer, unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	52.44	53.06	6/30/86
Copper (C)	64.00-68.00	64.50-68.50	6/27/86
Lead	22.50-24.00	24.00	6/25/86
Magnesium Ingot	153.00	148.00	12/ 9/85
Nickel (LME)	185.31	186.13	6/30/86
Zinc	41.00	38.00-41.00	6/17/86

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$236.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$346.75
Indium, dollars per troy oz.	$2.65
Iridium, dollars per troy oz.	$415.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$260.00-280.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.25
Palladium, per troy oz.	$112.00
Platinum, per troy oz.	$439.00
Rhodium, per troy oz.	$1,160.00
Silver ingots, per troy oz.	$5.125
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

June 23—243.09
June 24—243.86
June 25—243.66
June 19—242.37
Junn 20—242.24

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	62	53
Yellow brass	53¼	47½
Red brass	57	50¼
Comm. bronze	59	51
Mang. bronze	43	42
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	56
No. 2 copper wire	48
Light copper	39

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	52
No. 2 copper wire	44
Light copper	35
No. 1 composition	45
No. 1 comp. turnings	44
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	26
Radiators	34

Aluminum

New mixed clips	33	— 34
Old sheet	31	— 32
Old cast	31	— 32
Clean dry borings	32	— 33

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	28	— 29
Mixed L.C. clips	26	— 27
Old sheets and cast	23	— 24
Borings and turnings	20	— 21
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	47	— 49
No. 2 copper wire	38	— 39
Light copper	32	— 34
Radiators	28	— 29
No. 1 composition	38	— 39
No. 1 composition turnings	35	— 36
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	38	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	15	— 16
Old diecast zinc	11	— 12

EFFECTIVE JUNE 30,1986

(Effective June 30,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	60.00 to	61.00
No. 1 dealer bundles	86.00 to	87.00
No. 1 factory bundles (auto)	90.00 to	91.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	83.00 to	84.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	42.00 to	43.00
Low phos. punchings plate	100.00 to	101.00
Heavy turnings	60.00 to	61.00
No. 1 RR hvy. melting	81.00 to	82.00
Rails, 2 ft. and under	93.00 to	94.00
Scrap rails, random lgth	80.00 to	81.00
RR specialties	93.00 to	94.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	520.00 to	530.00
18-8 turnings	420.00 to	430.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	67.00 to	68.00
No. 1 dealer bundles	82.00 to	83.00
No. 1 factory bundles (auto)	78.00 to	79.00
No. 2 dealer bundles	56.00 to	57.00
No. 1 busheling	77.00 to	78.00
Shredder scrap	77.00 to	78.00
Machine shop turnings	27.00 to	28.00
Mixed borings and turnings	22.00 to	23.00
Shoveling turnings	29.00 to	30.00
Cast iron borings	41.00 to	42.00
Low phos. forge crop	97.00 to	98.00
Low phos. punchings plate 1/4 in. and heavier	112.00 to	113.00
Low phos. 2 ft. and under	106.00 to	107.00
No. 1 RR hvy. melting	75.00 to	76.00
Scrap rails random lgth	79.00 to	80.00
Reroller rails	104.00 to	105.00
Rails, 2 ft. and under	99.00 to	100.00
RR couplers and knuckles	90.00 to	91.00
RR car axles	106.00 to	107.00
No. 1 machinery cast	105.00 to	106.00
Cupola cast	92.00 to	93.00
Stove plate	97.00 to	98.00
Steel car wheels	87.00 to	88.00
Stainless		
18-8 bundles and solids	485.00 to	495.00
18-8 turnings	400.00 to	410.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 70.00 to	$ 73.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	52.00 to	55.00
No. 1 busheling	81.00 to	83.00
Shredder scrap	82.00 to	85.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	37.00 to	40.00
Low phos. 5 ft. and under	74.00 to	77.00
Low phos. 2 ft. punchings	93.00 to	96.00
Electric furnace bundles	85.00 to	88.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	94.00 to	97.00
Cupola cast	85.00 to	88.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	62.00 to	63.00
No. 2 bundles	33.00 to	34.00
No. 1 busheling	61.00 to	62.00
Drop forge flashings	42.00 to	43.00
Machine shop turnings	28.00 to	29.00
Mixed borings and turnings	8.00 to	9.00
Shoveling turnings	28.00 to	29.00
Cast iron borings	21.00 to	22.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	47.00 to	48.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	480.00 to	490.00
18-8 turnings	345.00 to	355.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 57.00 to	$ 58.00
No. 2 hvy. melting	55.00 to	56.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 dealer bundles	35.00 to	36.00
Machine shop turnings	19.00 to	20.00
Shoveling turnings	19.00 to	20.00
Low phos. plate	71.00 to	72.00
Electric furnace bundles	60.00 to	61.00
Galvanized bundles	58.00 to	59.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	76.00 to	77.00
No. 1 factory bundles	71.00 to	72.00
No. 2 bundles	32.00 to	33.00
No. 1 busheling	66.00 to	67.00
Machine shop turnings	19.00 to	20.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	17.00 to	18.00
Cut structural & plates, 5 ft. and under	67.00 to	68.00
Cut structural & plates, 2 ft. and under	88.00 to	89.00
Low phos. punchings plate	88.00 to	89.00
Foundry steel, 2 ft. & under	53.00 to	54.00
No. 1 RR hvy. melting	59.00 to	60.00
Rails, 2 ft. and under	88.00 to	89.00
Rails, 18 in. and under	90.00 to	91.00
No. 1 machinery cast	79.00 to	80.00
Mixed cast	46.00 to	47.00
Stainless		
18-8 bundles	480.00 to	490.00
18-8 turnings	350.00 to	360.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	40.00 to	41.00
No. 1 busheling	66.00 to	67.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	13.00 to	14.00
Mixed boring and turnings	13.00 to	14.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	23.00 to	24.00
Low phos. plate	74.00 to	75.00
Structural and plate, 2 ft. and under	75.00 to	76.00
Rails, 2 ft. and under	75.00 to	76.00
Scrap rails, random lgth	61.00 to	62.00
No. 1 machinery cast	74.00 to	75.00
No. 1 cupola cast	71.00 to	72.00

St. Louis

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 busheling	79.00 to	80.00
No. 1 dealer bundles	77.00 to	78.00
No. 2 bundles	46.00 to	47.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	27.00 to	28.00
No. 1 RR hvy. melting	73.00 to	74.00
Rails, random length	74.00 to	75.00
Rails, 18 in. and under	97.00 to	98.00
RR specialties	74.00 to	75.00
Cupola cast	69.00 to	70.00
Heavy breakable cast	43.00 to	44.00
Stove plate	89.00 to	90.00
Steel car wheels	78.00 to	79.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	54.00 to	55.00

Birmingham

No. 1 hvy. melting	$ 68.00 to	$ 69.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	68.00 to	69.00
No. 2 bundles	44.00 to	45.00
No. 1 busheling	68.00 to	69.00
Shredder scrap	86.00 to	87.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	36.00 to	37.00
Electric furnace bundles	65.00 to	66.00
Elec. furnace, 3 ft. & under	68.00 to	69.00
Structural and plate, 2 ft.	87.00 to	88.00
Structural and plate, 4 ft.	81.00 to	82.00
No. 1 RR hvy. melting	81.00 to	82.00
Scrap rails, random lgth	70.00 to	71.00
Rails, 2 ft. and under	85.00 to	86.00
Angles and splice bars	81.00 to	82.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	72.00 to	73.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	75.00 to	76.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	75.00 to	76.00
No. 1 cupola cast	64.00 to	65.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	68.00 to	69.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	33.00 to	34.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	440.00 to	460.00
18-8 turnings	340.00 to	360.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 51.00
No. 2 hvy. melting	39.00 to	41.00
No. 1 dealer bundles	50.00 to	52.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	56.00 to	58.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	72.00 to	77.00
Mixed cupola cast	44.00 to	46.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	20.00 to	21.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 34.00 to	$ 36.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	67.00 to	69.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 76.00
No. 2 hvy. melting, cut 2 ft. and under	67.00
No. 1 dealer bundles	82.00
No. 2 bundles	58.00
Mixed steel scrap	53.00
Bush. new fact. prep'd	77.00
Bush. new fact. unprp'd	60.00
Machine shop turnings	30.00
Short steel turnings	30.00
Mixed borings and turnings	19.00
Cast scrap	92.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 59.00 to	$ 60.00
No. 2 hvy. melting	49.00 to	50.00
No. 2 bundles	33.00 to	34.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	24.00 to	25.00
Shredder scrap	67.00 to	68.00
Cut structural plate, 2 ft. and under	91.00 to	92.00
Cut structural plate, 5 ft. and under	67.00 to	68.00
Unstripped motor blocks	54.00 to	55.00
Cupola cast	81.00 to	82.00

PRICES FIRMING UP? NO, NOT YET

Producer prices in May showed some signs of firming.

In May, the U.S. Labor Department's producer price index for finished goods rose for the first time in five months. The May index was up 0.6 pct.

During the preceding four months, there was an average monthly *decline* of 1.0 pct.

But don't be fooled. Any real firming of prices has not yet happened.

Most of the turnaround in finished goods prices in May was caused by a slowdown in the price climb of finished energy goods. These prices in May rose by 4.2 pct, following an 8.4 pct rise in April. If these prices are excluded, then no signs of firming are yet seen across the broad spectrum of industry wholesale prices.

The continuing price softness is seen clearly in the table here. There are 22 key metalworking product lines shown. In May, 14 of the products showed either no month-to-month changes in prices or actual declines.

And, for the eight product lines showing higher prices in May over April, 5 of them had increases of only 0.1 pct.

Prices of capital equipment in May rose by only 0.1 pct, down from a 0.3 pct rise in each of the previous two months. Price softness for these goods is understandable in view of cooled demand for capital equipment. Business investment has slowed sharply in recent months.

Through the first five months this year, producer prices declined at a seasonally adjusted annual rate of 7.6 pct. That is the softest price performance over such a time span since the Labor Department began keeping its price index in 1947.

Latest Month Covered: May 1986

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	400.1	− 0.1	+ 0.9
Metal Forming Machine Tools	438.9	+ 0.1	+ 1.6
Agricultural Machinery & Equip.	339.4	0	+ 0.3
Construction Machinery & Equip.	366.3	+ 0.1	+ 1.2
Oil and Gas Field Machinery	424.0	0	− 0.6
Industrial Material Handling Equip.	296.4	+ 0.1	+ 0.6
Pumps, Compressors & Allied Equip.	359.6	− 0.4	+ 1.0
Mining Machinery & Equipment	379.7	− 0.6	0
Mechanical Power Transmission Equip.	343.1	− 0.2	+ 1.5
Automobiles	233.3	+ 0.2	+ 2.3
Motor Trucks – Light	313.0	− 0.1	+ 5.9
Motor Trucks – Heavy	344.0	+ 1.1	+ 3.2
Railroad Equipment	364.5	− 0.3	+ 0.5
Fabricated Metal Structural Products	314.9	− 0.1	+ 0.1
Electric Motors	351.8	+ 0.6	0
Valves & Fittings (Dec. 1982 = 100)	106.6	− 0.6	+ 2.0
Ball & Roller Bearings	355.7	0	+ 1.0
Foundry & Forge Shop Products	364.8	− 0.1	+ 0.6
Heating Equipment	266.8	− 0.2	+ 2.8
Plumbing Fixtures & Brass Fittings	322.9	+ 0.1	+ 3.3
Metal Containers	361.1	+ 0.1	+ 0.9
Internal Combustion Engines	352.5	− 0.1	+ 3.6

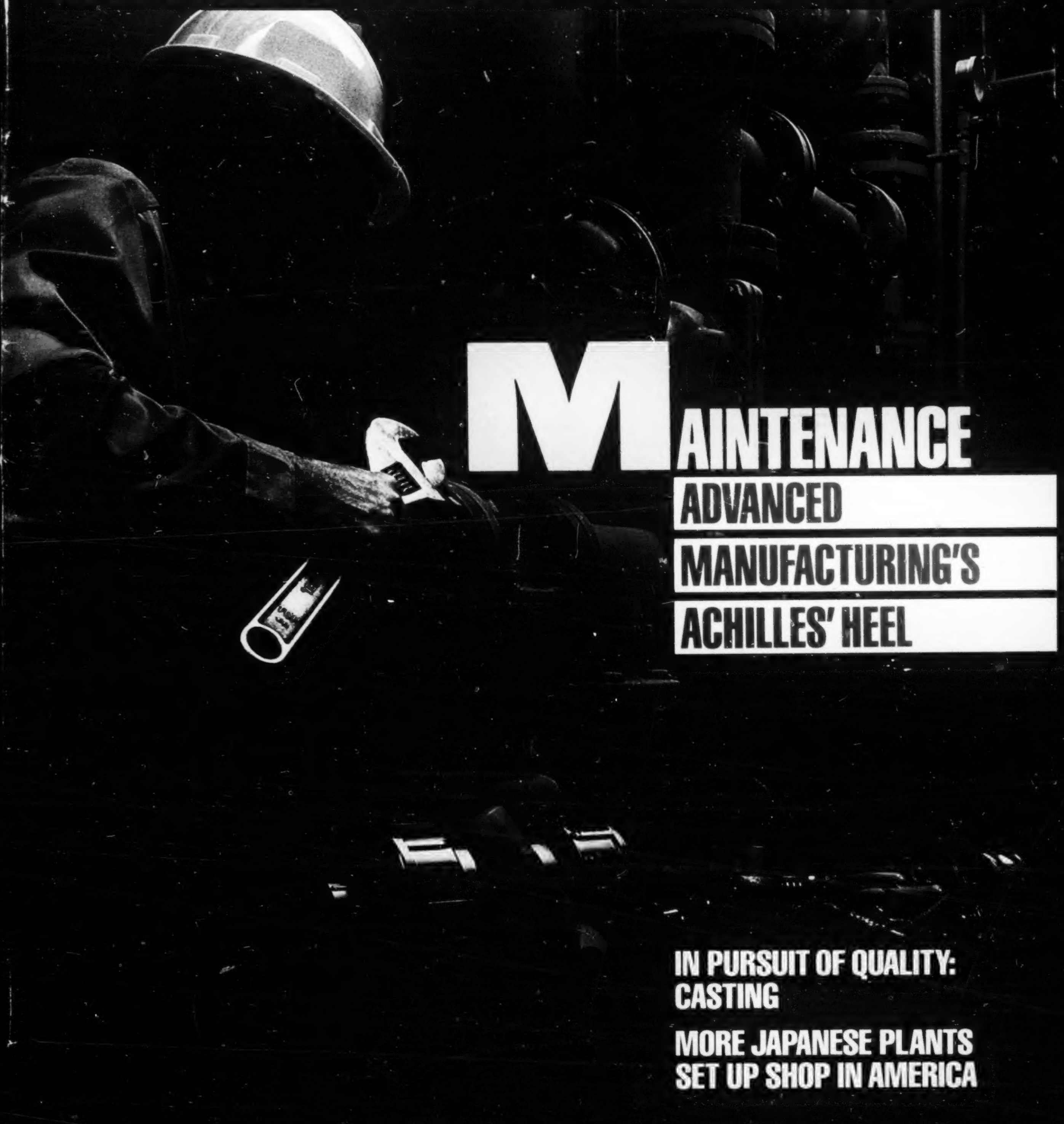
Data based on U.S. Labor Dept.'s Producer Price Index

C2150-8

IRON AGE

AUGUST 1, 1986

MANUFACTURING MANAGEMENT



MAINTENANCE

ADVANCED MANUFACTURING'S ACHILLES' HEEL

IN PURSUIT OF QUALITY: CASTING

MORE JAPANESE PLANTS SET UP SHOP IN AMERICA

AUGUST 1, 1986 VOL. 229, NO. 15

IRON AGE
MANUFACTURING MANAGEMENT

Editorial 7
Back to fight another day?

Newswatch 13
Toyota hopes to buy American steel and parts for its Kentucky plant.

You and Your Job 22
For apartment or offices, furniture rental can pay off.

Casting 23
Statistical process control is helping the foundry industry.

Maintenance 31
Obsolete practices can undermine advanced manufacturing.

Japanese Plants 39
The Japanese are setting up shop in the U.S. in a big way.

Galfan 47
Superior zinc-aluminum coating is available domestically.

Technically Speaking 52
Aramid fiber bicycle speeds at 65 mph.

Materials Report 62
Steel orders should begin to climb in August.

Order Trends 68
Flat trend gives way to a downtrend.

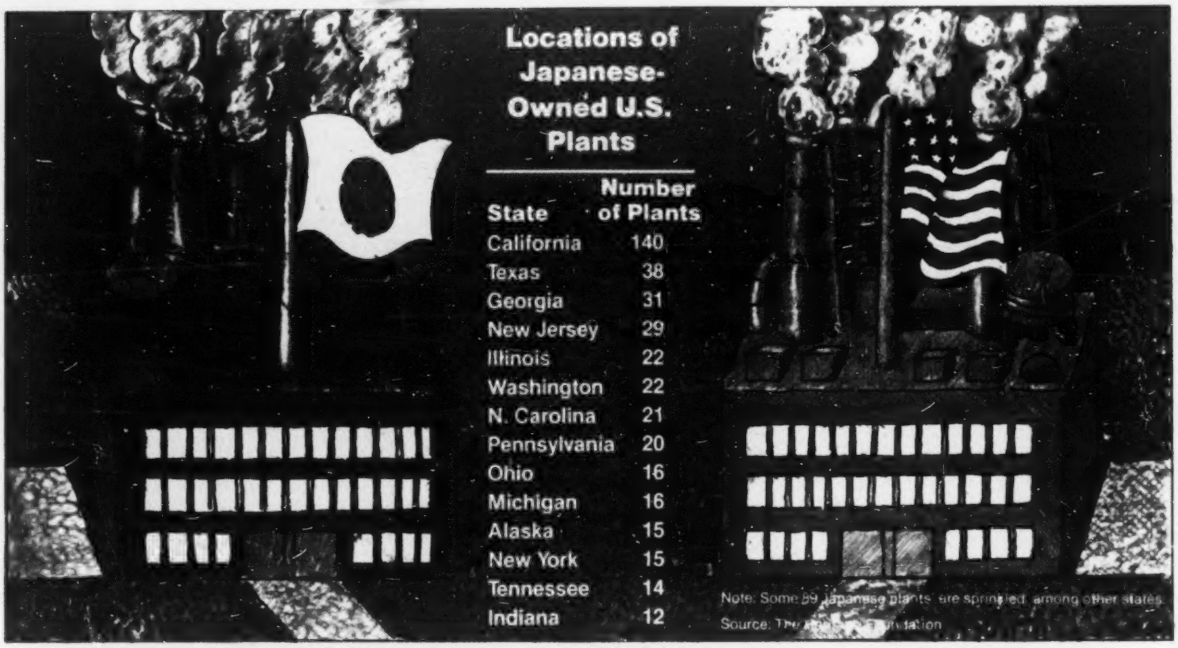
Next Issue: IMTS '86: Changing World of Machine Tools.

Departments

EDITORIAL STAFF 8
LETTERS 11
INDUSTRIAL BRIEFS 20
PRODUCT & EQUIPMENT REVIEW 55
FYI 58
MANAGEMENT SERVICE CARD 59
AD INDEX 61
BUSINESS STAFF 61
P&P DATA 7/14 64
FERROUS SCRAP 7/14 65
CLEARING HOUSE 66

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition – $52 one year, $85 Canada/Foreign (24 issues). Metalsproducer edition – $30 one year, $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 2040, Radnor, PA, 19089.

Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES



Locations of Japanese-Owned U.S. Plants

State	Number of Plants
California	140
Texas	38
Georgia	31
New Jersey	29
Illinois	22
Washington	22
N. Carolina	21
Pennsylvania	20
Ohio	16
Michigan	16
Alaska	15
New York	15
Tennessee	14
Indiana	12

Note: Some 89 Japanese plants are sprinkled among other states.

Source: The [illegible] Foundation

JAPANESE SET UP SHOP IN U.S.A. IN A BIG WAY

The strong yen and protectionism fears spur Japanese manufacturers to set up more operations in this country. These plants often become market leaders—particularly in metalworking product lines.

BY JOHN D. BAXTER

Japanese exports to this country are easing off—not much, but some. And that is the first sign of cooling in a long, long time.

That news is music to the ears of many import-battered U.S. manufacturing industry executives.

Still, quite a number of executives are not beguiled by the music of import relief. They hear, at the same time, another tune being played. And this is marching music—as Japanese competitors march, in ever-increasing numbers, into this country with their plants, not just their products. They are setting up shop in America to make their goods here.

The trend for the Japanese to set up plants, acquire plants or enter into joint ventures in the U.S. is not a new one, of course. The Japanese already have a strong presence in goods-producing in this country. But the direct investment trend seems to be gaining strength, and it shows every sign of becoming stronger as time goes on.

More than that, as will be noted, the trend promises to increase the *intensity* of industry competition in this country to levels unmatched in the past.

Japanese exports to this country will continue to roll in, and in good-size numbers. But more and more, U.S.-based Japanese-owned or controlled plants likely will become a growing competitive scourge for U.S. manufacturers.

In a recent study, by the Heritage Foundation, it was noted that Japanese direct investment in this country grew from $229 million in 1970 to a currently-estimated $17 billion. Morever, through that period, the shift of investment has been from nonmanufacturing to manufacturing.

The researcher at the foundation cited a survey run last year by the Japan Economic Institute that showed that in 1970 there were only 12 U.S. manufacturing companies in which Japanese firms held more than 50 pct of the stock. But by 1985, there were nearly 400 such companies—plus more than 500 U.S. plants fully owned by Japanese.

It is not just the growing size of the Japanese investment gains in

U.S. manufacturing that is significant to industry executives. An important point is that much of this investment is taking dead aim on their markets.

For example, U.S. basic goods manufacturing industries are restructuring to an extent far greater than in other manufacturing sectors. And it is industry restructuring that is creating direct investment opportunities for Japanese manufacturers.

In the U.S. Commerce Dept.'s latest report on expenditures made by foreign investors to acquire or establish U.S. businesses, it was noted that, "Continued economic growth in the U.S. and other developed countries, and *corporate restructuring in the U.S.* were the key factors in the increased spending."

Target: Basic Goods

In short, many of Japanese direct investment dollars are pouring into what is termed a "hollowing" U.S. manufacturing structure. And much of that hollowing involves basic goods industries such as steel, autos and industrial machinery.

As can be seen in the table here, the Japanese do not have the largest direct investment base in this country. Their investment total of $17 billion is far surpassed by the United Kingdom's $43 billion and the Netherland's $35 billion.

But again, it is in the nature and the trend of U.S. investment by the Japanese that is distinctive. In a Commerce Dept. compilation of direct investments covering the first three quarters last year, Japan accounted for 86 investments in terms of number of transactions. That surpassed the 80 made by the United Kingdom and the 18 made by the Netherlands.

Direct Investment in U.S. Manufacturing by Country of Origin

Millions of Dollars

	1984	1985
All countries	$3,106	$11,435
Europe	1,952	9,174
Canada	289	1,155
Japan	265	611

Source: U.S. Commerce Dept.

Aside from plant construction and expansion investments, other foreign direct outlays made in the period went for acquisitions (where the UK led), equity increases, realty transactions and other targets. That is the range of investments considered to be 'direct.' And by U.S. Commerce Dept. definition, an investment becomes 'direct' when a foreign source owns 10 pct or more of the stock. In Wall Street terms, an investment of less than 10 pct is considered a 'portfolio' investment.

Direct investment in U.S. manufacturing by Japanese corporations is bound to grow and to grow strongly. The forces propelling the drive seem too strong to expect otherwise.

The immediate cause of the rising tide of Japanese manufacturing here is the recent strengthening of the yen. The yen, in less than a year's time, has appreciated in relation to the dollar by more than 35 pct. And, of course, the higher the yen goes, the more costly become Japanese imports in world markets.

The Japanese, in order to hold on to their cherished high import-won market shares in many countries have been taking a beating as far as profits go.

That situation makes exporting all the less attractive to many Japanese manufacturers. It has led them to look around for better, more profitable ways, to sell in foreign markets.

One possible more profitable way, of course, is direct investment. In view of the rise in the value of the yen, Japanese can now, in effect, buy 35 pct more plants here per yen than they could just nine months ago. If the yen rises further, exporting will become even less attractive to the Japanese, and direct investment all the more attractive.

The yen situation lately has been aggravated by a softening Japanese economy. In late June, Japan reported that it has experienced its first quarterly economic contraction in 11 years. Further, its leading indicator index now points to further contraction. As one trade analyst summed up, "It's another good reason for more Japanese manufacturers to start looking for overseas plant sites or acquisitions."

Another Growth Spur

Another spur to direct investment by Japanese manufacturers is the rise of protectionism sentiment throughout the world. Simply, Japan's vaunted strength in exporting, and the huge global trade surplus balances it has run up is coming back to haunt it—haunt it with a world-wide rising tide of protectionism, that is.

Japan's trade surplus last year was up a whopping $12.5 billion to a record $46.5 billion.

(In contrast, in May the U.S. trade *deficit* ran at an annual rate of $170 billion).

Washington observers generally report that the mood of Congress is moving towards protectionism. A similar mood has been noted in the 10-nation European Economic Community.

But, U.S. protection proponents will find it is easier to try to block imports than it is to block direct investments. Protectionism as understood in this country, means protection from imports, not from direct investment. After all, this country itself has long been the world leader in setting up production in other countries. Japan is just playing this country's game when it sets up shop here. At this time, more than 50 pct of the world's overseas investment is held by the U.S. and Japan.

Some Pluses

There are perceived advantages for this country to direct invest-

Foreign investment in U.S. industry swells . . .

Foreign Direct Investment in U.S. Industry
Millions of Dollars

	1983	1984	1985
All U.S. Industry	$8,091	$15,197	$19,547
Manufacturing, Total	3,113	3,106	11,435
Primary & Fabricated Metals	177	558	995
Machinery, Nonelectrical	98	375	655
Machinery, Electrical	373	160	835

...and individual investments grow larger

	1983	1984	1985
Total Number of Investments Made in U.S.	775	764	508
Dollar Value of Investments (Billions $)	$8.1	$15.2	$19.5

ments that are not seen in imports. For example, the more than 500 Japanese-owned manufacturing companies that now run plants in this country, directly employ 100,000 Americans, according to research economist Katsuro Sakoh.

He also noted that another 300,000 American jobs are filled by parts suppliers, transportation companies, distributors and various other support firms.

Mr. Sakoh is a senior policy analyst at the Washington think tank, Asian Studies Center. His study was published earlier this year by the Heritage Foundation.

The analyst noted other advantages of direct investment to this country. "Increased Japanese investment in the U.S., especially in the manufacturing sector," he said, "reduces imports from Japan while promoting the transfer of new Japanese technology and managerial expertise to the U.S. Over time, these contributions will increase U.S. competitiveness in world markets and will improve the overall trade balance."

There is another reason to expect Japanese manufacturers to step up their investments overseas, including the U.S. That country is undergoing what Japanese Prime Minister Yasuhiro Nakasone earlier this year promised President Reagan—"an historical transformation."

The blueprint for this transformation is a White Paper referred to as the Maekawa Report. Basically, this plan calls for Japan to change from an exporting country into an importing one. This means the domestic economy must be given prime attention by Japanese rulers.

A social upheaval in Japan is spurring this transformation. The nation's social and physical infrastructure has lagged far behind its international trade successes. In this transformation, Japan's world-raider manufacturers are no longer heroes in the minds of many Japanese people.

In sum, the new policies are expected to drive many Japanese manufacturers overseas where they can go after bigger markets and be less constricted in their growth efforts.

There is still another important reason to believe that more Japanese manufacturing companies will be setting up shop in this country. Simply, they are being invited, enticed and lured by many states in this country. The interest of state officials, of course, centers on employment and economic development for their states.

To win foreign plants the states compete with one another by offering special grants, tax breaks and other benefits.

According to the National Assn. of State Development Agencies, some 31 states now have a total of 70 offices in foreign countries set up to recruit businesses for their regions. Target A clearly appears to be Japanese plants. Some 22 states have representatives in that country.

California might be considered the beachhead state in the Japanese investment invasion in this country. That state now has 140 Japanese plants, according to the Heritage Foundation report.

There is good reason for U.S. basic goods manufacturers to be deeply concerned about the rise in numbers of Japanese plants in this country. It spells tougher-than-ever competition in many markets.

One U.S. financial analyst has said, "An importer who is a tough competitor is even tougher when he becomes a made-in-America competitor. I've never seen it happen otherwise."

That observation, based mostly on experience in the auto industry, sounds like a clear warning that U.S. companies likely will be facing more and more U.S.-based Japanese competition.

Tough Competitors

Another warning comes from a survey of U.S.-based Japanese-owned companies that was sponsored last year by the Columbia University Graduate School of Business. The analysts summed up their study: "Japanese-owned firms operating in the United States are outperforming their American competitors."

The Columbia report was based on a study of 159 companies "spanning a variety of industries." It credited the success of the Japanese companies to their emphasis on quality and customer service, and the cultivation of

The Flow of U.S. Direct Investment

Dollar Data in Billions

	1983	1984	1985
U.S. investments made abroad	$207.2	$213.0	$237.7
Pct increase from Previous Year	2.3%	2.8%	9.2%
Foreign investments made in U.S.A.	$137.2	$164.6	$183.0
Pct increase from previous year	9.9%	20.0%	11.2%

Source: U.S. Commerce Dept.

warm relationships between labor and management.

Both the researchers and the Japanese managers labeled as "most important" the involvement of workers in a corporate family.

Stated the report: "By emphasizing a spirit of teamwork and cooperation at all levels of the organizations, they have capitalized on the American desire to be part of a winning team."

Many American companies, in an effort to emulate the great successes of Japanese manufacturing plants, have turned to many of the management techniques used in Japan. But U.S.-based Japanese plants use the techniques little or not at all.

For example, Quality Control Circles, as noted in the study, are used by only 10 pct of the plants surveyed. Just-in-Time inventory control is "used infrequently." And decision-making by consensus is "rarely used."

The elements that remain in common use in both Japan and the U.S. by the surveyed firms was the emphasis on worker involvement, product quality and customer service.

The winning edge of the Japanese plants over U.S. competitors, for one, was seen in 'percent defectives' (the percentage of goods and services deemed unsatisfactory). These ran at 5 pct or less among 95 pct of the surveyed companies. About 50 pct of the firms had a defective rate lower than 0.5 pct. The analysts noted this record compares with a "perhaps 10 pct to 15 pct defectives in American factories."

In worker absenteeism, the respondent firms showed 50 pct with absenteeism less than 1 pct; 95 pct reported less than 5 pct absenteeism. This compares to a national average in U.S. plants of about 5 pct.

Notably, about one-third of the Japanese-owned plants were unionized. Also, even more notably about these plants, the researchers found that "the past three years have seen improvements in many aspects of their performance."

There has been widespread belief that when Japanese companies set up plants in this country they would soon fall into the management patterns of American corporate leaders. However, it is developing that these companies may well be tougher competitors because they have not followed U.S. management patterns.

For example, a recent study by the Japanese government compared corporate objectives of nearly 500 major U.S. and Japanese companies. The study found that U.S. executives ranked return on investment as their principle corporate objective. Increases in price per share of company stock was ranked second, and in third place was market share held by the company.

This priority of objectives contrasted with those of Japanese executives who put market share at the top of their lists. Second, was return on investment, and new products placed third. Share price increase came in last position with the Japanese.

Market Share

So, Japanese-owned U.S. companies give top priority to, and go after, market share enlargement. They back that up by giving high priority to development and introduction of new and improved products. This, while U.S. companies try strongest to boost their returns on investment.

These differences in management priorities add up to another reason U.S. companies will face increasingly tough competition in their markets here as more Japanese plants dot the American landscape. The top priority of Japanese companies is ever-bigger slices of the markets they serve. And when those companies operate in this country, those markets are the ones now held by American companies. Japanese firms feel that big returns on their investments can wait; eventually, bigger market shares will assure those returns.

Noted one financial analyst, "The Japanese sure have logic on their side in the structuring of their corporate priorities."

Notably, also, Japanese-run companies design and use plant investments to win larger market shares. This, of course, takes time. But Japanese executives, unlike many of their American counterparts, are not handcuffed by concerns about short-term profit dilution when they see the competitive market need to acquire the latest equipment for their plants. They see market share enlargement as a long-term matter. And American managers probably will concede that competitors with state-of-the-art equipment are usually tough competitors.

Japanese imports showing signs of easing off? Sure. Easier days ahead for U.S. plants? Not likely. □

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective July 14,1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	159	143	172	168
Pittsburgh	161	169	213	210
Youngstown	93	66	97	97
Lake Erie	100	100	92	117
Detroit	127	125	148	137
Chicago	386	397	407	495
Midwest	159	165	178	167
Southern	171	174	189	210
Western	81	80	83	94
U.S. Production	1,437	1,419	1,579	1,695

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢–Mineral Services, 8/13/85. **59.4¢–Inland Steel Mining, 1/1/85 and Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢–U.S.Steel, 8/16/85. 86.9¢–Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective July 14,1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,437	1,419	47,348	47,441
Capability Utilization Rate	59.3	58.5	69.2	66.8

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 5/19/86)	24.850	24.850	24.850	27.582
Pig Iron** (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 71.83	$ 71.50	$ 70.83	$ 68.83
No. 2 bundles	$ 52.50	$ 52.50	$ 51.50	$ 50.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 71.50	$ 71.50	$ 69.50	$ 72.50
No. 1 steel, Philadelphia	72.50	71.50	71.50	70.50
No. 1 steel, Chicago	71.50	71.50	71.50	63.50
No. 1 bundles, Detroit	66.50	66.50	57.50	64.50
Low Phos., Youngstown	71.50	71.50	68.50	57.50
No. 1 mach'y cast., Pgh	74.50	74.50	73.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	91.50
No. 1 mach'y cast., Chi	105.50	105.50	105.50	99.50

---

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective July 14,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	51.33	52.00	7/14/86
Copper (C)	63.00-64.00	62.50-64.00	7/11/86
Lead	21.00-24.00	22.00-24.00	7/ 9/86
Magnesium Ingot	153.00	148.00	12/ 9/85
Nickel (LME)	177.06	179.34	7/14/86
Zinc	41.00-44.00	41.00	7/ 1/86

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony. American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$248.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$345.75
Indium, dollars per troy oz.	$2.65
Iridium, dollars per troy oz.	$415.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$260.00-280.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.25
Palladium, per troy oz.	$112.00
Platinum, per troy oz.	$434.00
Rhodium, per troy oz.	$1,160.00
Silver ingots, per troy oz.	$5.02
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

July 7—247.78
July 8—246.89
July 9—243.37
July 10—244.09
July 11—244.37

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	61	52
Yellow brass	51	47½
Red brass	54¼	53
Comm. bronze	55¾	52
Mang. bronze	42½	41½
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	47
Light copper	38

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	51
No. 2 copper wire	43
Light copper	34
No. 1 composition	45
No. 1 comp. turnings	44
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	26
Radiators	34

Aluminum

New mixed clips	33	— 34
Old sheet	31	— 32
Old cast	31	— 32
Clean dry borings	32	— 33

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	28	— 29
Mixed L.C. clips	26	— 27
Old sheets and cast	23	— 24
Borings and turnings	20	— 21
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	47	— 49
No. 2 copper wire	38	— 39
Light copper	32	— 34
Radiators	27	— 28
No. 1 composition	38	— 39
No. 1 composition turnings	35	— 36
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	38	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	16	— 17
Old diecast zinc	12	— 13

EFFECTIVE JULY 14, 1986

(Effective July 14, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	61.00 to	62.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	90.00 to	91.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	83.00 to	84.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	44.00 to	45.00
Cast iron borings	43.00 to	44.00
Low phos. punchings plate	101.00 to	102.00
Heavy turnings	61.00 to	62.00
No. 1 RR hvy. melting	81.00 to	82.00
Rails, 2 ft. and under	93.00 to	94.00
Scrap rails, random lgth	80.00 to	81.00
RR specialties	93.00 to	94.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	515.00 to	525.00
18-8 turnings	415.00 to	425.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	67.00 to	68.00
No. 1 dealer bundles	84.00 to	85.00
No. 1 factory bundles (auto)	84.00 to	85.00
No. 2 dealer bundles	56.00 to	57.00
No. 1 busheling	78.00 to	79.00
Shredder scrap	78.00 to	79.00
Machine shop turnings	27.00 to	28.00
Mixed borings and turnings	22.00 to	23.00
Shoveling turnings	29.00 to	30.00
Cast iron borings	41.00 to	42.00
Low phos. forge crop	97.00 to	98.00
Low phos. punchings plate 1/4 in. and heavier	112.00 to	113.00
Low phos. 2 ft. and under	106.00 to	107.00
No. 1 RR hvy. melting	75.00 to	76.00
Scrap rails random lgth	79.00 to	80.00
Reroller rails	104.00 to	105.00
Rails, 2 ft. and under	99.00 to	100.00
RR couplers and knuckles	90.00 to	91.00
RR car axles	106.00 to	107.00
No. 1 machinery cast	105.00 to	106.00
Cupola cast	92.00 to	93.00
Stove plate	97.00 to	98.00
Steel car wheels	87.00 to	88.00
Stainless		
18-8 bundles and solids	485.00 to	495.00
18-8 turnings	400.00 to	410.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 71.00 to	$ 74.00
No. 2 hvy. melting	63.00 to	66.00
No. 1 dealer bundles	83.00 to	86.00
No. 2 dealer bundles	53.00 to	56.00
No. 1 busheling	83.00 to	86.00
Shredder scrap	82.00 to	85.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	37.00 to	40.00
Low phos. 5 ft. and under	76.00 to	79.00
Low phos. 2 ft. punchings	93.00 to	96.00
Electric furnace bundles	85.00 to	88.00
RR specialties	76.00 to	79.00
Rails, 2 ft. and under	96.00 to	99.00
Cupola cast	85.00 to	88.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	33.00 to	34.00
No. 1 busheling	64.00 to	65.00
Drop forge flashings	42.00 to	43.00
Machine shop turnings	28.00 to	29.00
Mixed borings and turnings	8.00 to	9.00
Shoveling turnings	28.00 to	29.00
Cast iron borings	21.00 to	22.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	47.00 to	48.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	470.00 to	480.00
18-8 turnings	340.00 to	350.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 56.00 to	$ 57.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 dealer bundles	32.00 to	33.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Low phos. plate	71.00 to	72.00
Electric furnace bundles	60.00 to	61.00
Galvanized bundles	58.00 to	59.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 dealer bundles	76.00 to	77.00
No. 1 factory bundles	71.00 to	72.00
No. 2 bundles	30.00 to	31.00
No. 1 busheling	66.00 to	67.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Cut structural & plates, 5 ft. and under	67.00 to	68.00
Cut structural & plates, 2 ft. and under	88.00 to	89.00
Low phos. punchings plate	88.00 to	89.00
Foundry steel, 2 ft. & under	53.00 to	54.00
No. 1 RR hvy. melting	59.00 to	60.00
Rails, 2 ft. and under	88.00 to	89.00
Rails, 18 in. and under	90.00 to	91.00
No. 1 machinery cast	79.00 to	80.00
Mixed cast	46.00 to	47.00
Stainless		
18-8 bundles	470.00 to	480.00
18-8 turnings	345.00 to	355.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 busheling	68.00 to	69.00
No. 1 dealer bundles	68.00 to	69.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	13.00 to	14.00
Mixed boring and turnings	13.00 to	14.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	23.00 to	24.00
Low phos. plate	76.00 to	77.00
Structural and plate, 2 ft. and under	77.00 to	78.00
Rails, 2 ft. and under	75.00 to	76.00
Scrap rails, random lgth	61.00 to	62.00
No. 1 machinery cast	74.00 to	75.00
No. 1 cupola cast	71.00 to	72.00

St. Louis

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 busheling	79.00 to	80.00
No. 1 dealer bundles	79.00 to	80.00
No. 2 bundles	46.00 to	47.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	27.00 to	28.00
No. 1 RR hvy. melting	74.00 to	75.00
Rails, random length	74.00 to	75.00
Rails, 18 in. and under	97.00 to	98.00
RR specialties	74.00 to	75.00
Cupola cast	69.00 to	70.00
Heavy breakable cast	43.00 to	44.00
Stove plate	89.00 to	90.00
Steel car wheels	78.00 to	79.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	54.00 to	55.00

Birmingham

No. 1 hvy. melting	$ 68.00 to	$ 69.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	68.00 to	69.00
No. 2 bundles	44.00 to	45.00
No. 1 busheling	68.00 to	69.00
Shredder scrap	86.00 to	87.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	36.00 to	37.00
Electric furnace bundles	65.00 to	66.00
Elec. furnace, 3 ft. & under	68.00 to	69.00
Structural and plate, 2 ft.	87.00 to	88.00
Structural and plate, 4 ft.	81.00 to	82.00
No. 1 RR hvy. melting	81.00 to	82.00
Scrap rails, random lgth	70.00 to	71.00
Rails, 2 ft. and under	85.00 to	86.00
Angles and splice bars	81.00 to	82.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	72.00 to	73.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	75.00 to	76.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	75.00 to	76.00
No. 1 cupola cast	64.00 to	65.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	68.00 to	69.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	33.00 to	34.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	440.00 to	460.00
18-8 turnings	340.00 to	360.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 51.00
No. 2 hvy. melting	39.00 to	41.00
No. 1 dealer bundles	50.00 to	52.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	56.00 to	58.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	72.00 to	77.00
Mixed cupola cast	44.00 to	46.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	20.00 to	21.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 34.00 to	$ 36.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	67.00 to	69.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 76.00
No. 2 hvy. melting, cut 2 ft. and under	67.00
No. 1 dealer bundles	82.00
No. 2 bundles	58.00
Mixed steel scrap	53.00
Bush. new fact. prep'd	77.00
Bush. new fact. unprp'd	60.00
Machine shop turnings	30.00
Short steel turnings	30.00
Mixed borings and turnings	19.00
Cast scrap	97.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 59.00 to	$ 60.00
No. 2 hvy. melting	49.00 to	50.00
No. 2 bundles	33.00 to	34.00
Machine shop turnings	11.00 to	12.00
Crushed turnings	24.00 to	25.00
Shredder scrap	67.00 to	68.00
Cut structural plate, 2 ft. and under	91.00 to	92.00
Cut structural plate, 5 ft. and under	67.00 to	68.00
Unstripped motor blocks	54.00 to	55.00
Cupola cast	81.00 to	82.00

FLAT TREND GIVES WAY TO DOWNTREND

New orders in May slipped—again—from the plateau they have been on since early 1984.

Orders for the month totaled $103.6 billion, down $100 million, or 0.1 pct, from April. That latest monthly total was $800 million lower than the $104.5 billion in orders posted back in March 1984.

Worse, lately, the long plateau appears to be slipping downward. In the latest 12-month period through May, orders showed four month-to-month gains and eight declines.

Actually, May orders data was worse than it looked. Volatile defense capital goods orders gave a deceptive hypo to total durable goods orders during the month. These defense orders were up a whopping 37 pct, to $8.9 billion. Excluding this defense burst of orders, all other durable goods orders were down 2.6 pct for the month of May.

Only one major metalworking industry group showed an increase in orders in May. That was the transportation equipment group. And even in that case, it was big jumps in orders for military aircraft and ships that accounted for all the gain.

Order declines ruled in machinery lines in May for both electrical and nonelectrical machinery. Orders received by the primary metals industries were down, as they were also for fabricated metals.

Economists generally continue to forecast a solid last half this year. This confuses some executives who live close to the present scene in durable goods orders. But a careful reading of most forecasts shows a big gap in the hard goods manufacturing sector. Capital spending and durable new orders just don't seem able to find a place in the overall economic recovery.

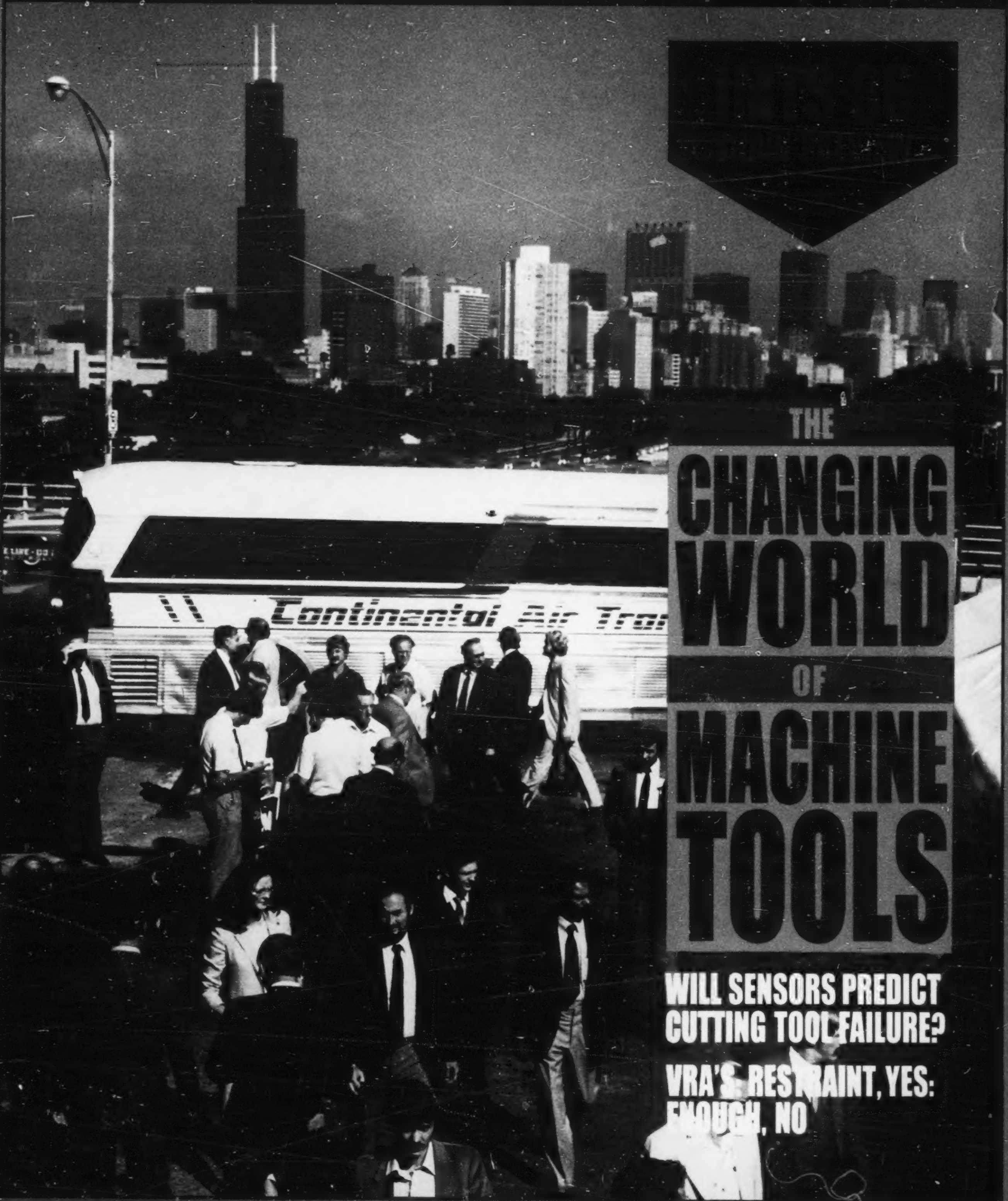
Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted Source: U.S. Dept of Commerce		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	2nd Q*	$400.7	$390.7	$387.8
Manufacturing, Total	2nd Q*	153.8	150.3	154.3
Manufacturing, Durable Goods	2nd Q*	72.7	71.1	74.0
Mining Industry	2nd Q*	14.3	14.1	16.5
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	May	103.6	103.7	103.0
Shipments	May	104.1	106.6	102.7
Inventories	May	187.5	188.0	191.5
Unfilled Orders	May	356.3	356.7	345.1
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	May	26.3	26.2	25.6
Capital Goods Producers Defense Industries	May	8.9	6.5	8.8
Primary Metals, Total	May	8.9	9.6	10.6
Steel (SIC 331)	May	3.5	3.9	4.2
Iron & Steel Castings (SIC 332)	May	1.2	1.4	1.4
Nonferrous Metals	May	4.2	4.3	5.0
Nonelectrical Mach.-Equip. Industries, Total	May	16.5	16.8	17.3
Engines & Turbines	May	1.1	1.3	1.0
Farm Mach.& Equipment (Shipments)	May	0.8	0.9	0.9
Construction, Mining & Mat. Hdlg. Equip	May	2.8	3.0	2.7
General Industrial Machinery	May	1.5	1.6	1.3
Metalworking Machinery	May	0.9	0.9	0.9
Machine Tools, Total ($Mill.)**	May	207.2	193.3	222.7
Machine Tools, Metalcutting**	May	143.2	136.2	170.7
Machine Tools, Metalforming**	May	64.0	57.1	52.0
Electrical Mach. & Equip. Industries, Total	May	14.7	15.5	14.9
Elec. Transmission & Ind. Equip.	May	2.0	1.9	2.0
Household Appliances	May	1.4	1.4	1.4
Communication Equipment	May	4.6	5.1	5.5
Transportation Equipment,Total	May	28.4	26.5	26.4
Motor Vehicles & Parts (Shipments)	May	17.0	18.1	16.7
Aircraft, Missiles & Parts	May	10.1	7.2	8.0
Shipbuilding & Military Tanks	May	0.7	0.4	1.0
Fabricated Metal Products, Total	May	14.2	14.7	13.6
Instruments, Total	May	4.8	4.5	4.8

*Est.—Commerce Dept; **Source: NMTBA

C2150

IRON AGE
AUGUST 15, 1986

MANUFACTURING MANAGEMENT



THE CHANGING WORLD OF MACHINE TOOLS

WILL SENSORS PREDICT CUTTING TOOL FAILURE?

VRA'S: RESTRAINT, YES: ENOUGH, NO

AUGUST 15, 1986 VOL. 229, NO. 16

IRON AGE
MANUFACTURING MANAGEMENT

Continental Air Tra

Departments

EDITORIAL STAFF	8
LETTERS	8
INDUSTRIAL BRIEFS	26
IMTS-86 PRODUCTS PREVIEW	79
FYI	98
MANAGEMENT SERVICE CARD	99
AD INDEX	101
BUSINESS STAFF	101
P&P DATA 7/28	102
FERROUS SCRAP 7/28	104
CLEARING HOUSE	106

Editorial 7
If only the President would show up.

Newswatch 11
Union leaders are prodding the Senate to pass a trade bill.

You and Your Job 24
Today's secretary: The coffee pot is on the back burner.

International Machine Tool Show 33
IMTS-86 will focus on the changing world of machine tools.

Sensing Devices 50
Sensors to predict machine failures are not yet available.

Voluntary Restraints 57
President Reagan's import restraints are a failure, critics say.

Westinghouse 71
Service has emerged as the company's top activity.

Technically Speaking 91
Lasers scribe lines for integrated circuits.

Materials Report 93
Is price cutting ruining the steel industry?

Price Trends 108
Prices continue on their journey to nowhere.

Next Issue: Manufacturing's New Glamour Materials.

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition – $52 one year, $85 Canada/Foreign (24 issues). Metalsproducer edition – $30 one year, $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 2040, Radnor, PA, 19089.

Chilton

ONE OF THE ABC PUBLISHING COMPANIES

NEWSWATCH

Unions lobbying Senate for passage of trade bill

Trade unions have seized on the massive U.S. trade deficit for a final lobbying blitz of the Senate for a protectionist trade bill.

The House overwhelmingly passed a tough trade bill this Spring that would protect U.S. industries such as steel and machine tools from heavy competition from imports. Since then, President Reagan swore to veto it, and the lobbying push shifted to the Senate, which may bow to pressure and pass a trade bill of its own this year.

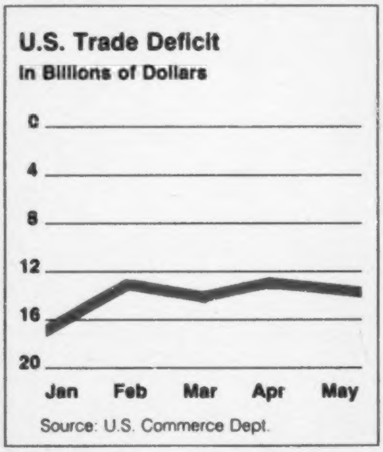
The AFL-CIO noted last month that the country's trade deficit soared to $14.2 billion in May – up 10 pct from the previous month. And, its officials noted, the $71.9 billion trade deficit for the first five months of this year was 25.5 pct over the deficit for the first five months of 1985.

In particular, the AFL-CIO noted that May's manufacturing deficit was $11.6 billion. That worked out to a shortfall in manufactured goods of $56.1 billion for the first five months of this year – 28.7 pct above the $43.6 billion recorded in the same period in 1985.

AFL-CIO Research Director Rudy Oswald said of the situation in the Senate, "The time for stalling is over. The time for action is clearly here. The Administration's policy of 'open markets' and 'free trade' is bankrupt. There is no way the President can continue to pretend that everything is going to come up roses."

Mr. Oswald continued, "The trade deficit is a growing menace to the national economy, to the jobs of American workers and to the survival of American industry. The Administration cannot wish the problem away. Because it won't act, the Congress must. It has to come to grips with this issue before it's too late."

Hard pressed manufacturers and unions also got a boost in the Senate from an unexpected source: the reaction of key Senate leaders to a report from the U.S. Commerce Department that the U.S. recorded its first farm trade deficit in 27 years in May. Many Senate Republican leaders, like Majority Leader Robert Dole (R-Kan.) come from hard-hit farm states. And, some of those politicians are up for reelection this year.


U.S. Trade Deficit
In Billions of Dollars

Source: U.S. Commerce Dept.

And, if the Senate passes a bill similar to the House measure, it would also provide trade protection for U.S. agricultural interests. Sen. Dole said, "If nothing is done to increase agricultural exports within the next two or three months, I expect pressures could build up to such a level in Congress that some legislative action will be taken."

He was joined by Sen. Robert Byrd (D-W.Va.) the Senate Minority Leader, who said, "The Administration may believe that a deficit in agricultural trade is acceptable, but I am sure that American farmers, suffering from a neglected trade policy, do not."

The May trade figures that sparked these actions show quickly widening trade gaps with some nations that are major steel exporters to the U.S. For example, the deficit with Japan widened to $4.99 billion in May from April's $4.7 billion. The deficit with Canada rose from $1.8 billion to $2.18 billion, and imports from Taiwan in May rose to $1.2 billion – up $200 million from the previous month.

U.S. trade restraints displease Europe's machine tool builders

Indignation greeted President Reagan's call for voluntary restraint on machine tool imports from Switzerland and West Germany.

"I can't imagine us limiting our exports to the U.S.," said a project manager of the Swiss company, Reishauer (Zurich). "I would have thought our exports to the U.S. are negligible in terms of the total exports from countries like Japan and Taiwan."

"Our North American exports are not significant as regards our total exports," Leif Lundkvist, chairman of Deckel A.G., Munich, West Germany, told **Iron Age**, during "Metav." the West German machine tool show held in Duesseldorf in June. "The U.S. machine tool builders ought to concern themselves more with rebuilding their exports. We have recorded significant market penetration in the U.S. because our universal milling approach to mold and die milling, reduces subsequent grinding costs, when compared with the traditional milling approach practiced in the U.S. and Britain."

Wolfgang Freese, Deckel's company secretary, said: "We never look to restrain our exports. Any kind of trade restriction is very detrimental to business—if machine tool companies need protectionist measures, they are unable to compete."

Rudiger Karau, marketing manager of Werner & Kolb Werkzeugmaschinen GmbH, Berlin, commented: "Big U.S. corporations buy standalone machine tools. There is no incentive for our U.S. competitors to develop a 'Hi-tech' systems capability."

He referred to two major Werner contracts in the U.S.—one for a $1 million-plus FMS-type system based on machining centers for a Texas Instruments plant in California. The other, valued at $1.5 million, is going to Fuller at Denver, Col. The company intends exhibiting a $1 million machining system at the IMTS-86.

U.S. Machine Tool Imports
Pct Share of Total Imports

	1984	1985
W. Germany	16.3	15.2
Switzerland	6.0	5.9
Taiwan	6.2	7.2
Japan	45.8	46.2

Source: W. German MTBA

Dr. Axel Kemna, chairman of Gildemeister, labeled the actions a political move on the part of the Reagan Administration. "It's not a practical move," he explained "particularly since the U.S.'s own turning machine industry has almost gone. The U.S. market sources lathes in Japan, West Germany and Switzerland. Everyone in the machine tool industry understands that President Reagan had to say something. In practice, it's not realistic."

Dr. Gutmann Habig, head of economics and statistics for the West German Machine Tool Builders' Association, expressed astonishment at Presidsent Reagan's call for voluntary restraint. "German machine tools have made a historical, steady and undisturbed development," he said. "We don't threaten the security of the U.S. Nor are we causing any difficulties to the U.S. machine tool industry. You could hardly say our supply volume has had a turbulent effect."

European companies are having second thoughts about FMS

"Some European companies have had some bad experience with flexible manufacturing systems (FMS)," Dr. Axel Kemna, new chairman of the West German Gildemeister Group, told **Iron Age** in London recently.

"The trend in West Germany is definitely back to cells, rather than big systems. Small and large companies have had tremendous problems," he added. "The trend is to stay with cells and link them, step-by-step, into systems."

Asked to elaborate on FMS problems, Dr. Kemna said: "Some companies had bad experiences. The FMS got out of administration control. They lost track of what they had bought, while the supplier lost track of what it had supplied! Now, there is more realism behind the 'step-by-step' trend.'

Although the turning divisions of Gildemeister has installed some 120 flexible manufacturing turning cells (FMTCs) in Western Europe, the company has only supplied standalone CNC turning centers to the U.S. market. "They like their machine-to-machine, standalone operation," said Dr. Kemna about U.S. machine shop practices. "The U.S. market has not developed towards FMTCs like Europe, except for the larger companies taking FMS."

Dr. Kemna chairs a profitable Gildemeister Group, headquartered in West Germany. In the fiscal year, 1985-86, the company built more than 1,000 CNC lathes. Turnover reached DM 650 million ($300 million). Order intake is 25 pct up on budget.

When asked about Japanese penetration into West German CNC turning markets, Dr. Kemna said it had reached 30 pct in 1980, but had firmly been pushed back to 20 pct by 1986. "We meet them on price and performance," he said. "We developed the NEFTC CNC lathe series specifically to meet Japanese competition. But while we are working at full capacity, they can beat us on delivery."

The smaller West German machine builders, companies with about 100 employees, apparently plowed profits back into product and facility development to meet Japanese competition. "These owners were content just to draw salaries," said Dr. Kemna.

If the West German machine tool industry had followed U.S./U.K. accounting practices, he said, the industry would never have recovered. "That's the strength of the German machine tool manufacturer," he said, "we did not make the 'fast' buck."

GE and Fanuc team up in factory automation market

General Electric Co. has found a Japanese partner to help it improve its competitive posture in the factory automation marketplace.

GE and Fanuc, Ltd., have reached agreement in principle to establish a new company, which will be called GE Fanuc Automation Corp. Each partner will own 50 pct of the company. Initial capitalization will be $200 million.

According to a GE spokes-person, the new company will help GE further expand its U.S. factory automation business into European and Asian markets.

For Fanuc, the joint venture is another step in its expanding role as a major supplier of factory automation products and services. In 1982, Fanuc set up a joint venture

PRICE & PRODUCTION DATA

(Effective July 28,1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	174	172	169	162
Pittsburgh	188	192	205	179
Youngstown	93	96	98	88
Lake Erie	79	84	88	121
Detroit	133	144	145	164
Chicago	388	412	408	451
Midwest	164	167	170	161
Southern	160	168	183	212
Western	82	80	84	92
U.S. Production	1,461	1,515	1,550	1,630

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢–Mineral Services, 8 13 85. **59.4¢–Inland Steel Mining, 1 1 85 and Pickands Mather, 8 1 85, delivered hold of vessel, upper Lake ports. ***72.5¢–U.S.Steel, 8 16 85. 86.9¢–Oglebay Norton 3 25 82; Hanna Mining and Cleveland-Cliffs 2 26 82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective July 28,1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,461	1,515	50,394	50,740
Capability Utilization Rate	60.3	62.5	68.8	66.7

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 5/19/86)	24.850	24.850	24.850	27.582
Pig Iron** (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	$ 72.17	$ 71.83	$ 71.17	$ 71.17
No. 2 bundles	$ 52.50	$ 52.50	$ 52.17	$ 51.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 72.50	$ 71.50	$ 70.50	$ 77.50
No. 1 steel, Philadelphia	72.50	72.50	71.50	72.50
No. 1 steel, Chicago	71.50	71.50	71.50	63.50
No. 1 bundles, Detroit	67.50	66.50	62.50	69.50
Low Phos., Youngstown	71.50	71.50	71.50	57.50
No. 1 mach'y cast., Pgh	74.50	74.50	73.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	91.50
No. 1 mach'y cast., Chi	105.50	105.50	105.50	99.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective July 28,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	51.13	50.17	7/28/86
Copper (C)	62.50-64.00	62.00-64.00	7/24/86
Lead	21.00-24.00	22.00-24.00	7/9/86
Magnesium Ingot	153.00	148.00	12/9/85
Nickel (LME)	177.93	177.45	7/28/86
Zinc	41.00-44.00	41.00	7/1/86

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$248.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$353.60
Indium, dollars per troy oz.	$2.65
Iridium, dollars per troy oz.	$415.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$230.00-250.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.25
Palladium, per troy oz.	$112.00
Platinum, per troy oz.	$445.00
Rhodium, per troy oz.	$1,160.00
Silver ingots, per troy oz.	$5.025
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

July 21—243.94
July 22—241.67
July 23—242.29
July 24—243.43
July 25—244.74

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	58	51
Yellow brass	50	46½
Red brass	53	48
Comm. bronze	54	48¼
Mang. bronze	42	41
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	47
Light copper	38

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	51
No. 2 copper wire	43
Light copper	34
No. 1 composition	45
No. 1 comp. turnings	44
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	26
Radiators	35

Aluminum

New mixed clips	33	— 34
Old sheet	31	— 32
Old cast	31	— 32
Clean dry borings	32	— 33

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	28	— 29
Mixed L.C. clips	26	— 27
Old sheets and cast	23	— 24
Borings and turnings	20	— 21
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	47	— 49
No. 2 copper wire	38	— 39
Light copper	32	— 34
Radiators	27	— 28
No. 1 composition	38	— 39
No. 1 composition turnings	35	— 36
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	38	— 40

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	16	— 17
Old diecast zinc	12	— 13

EFFECTIVE JULY 28, 1986

(Effective July 28, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 72.00	to	$ 73.00
No. 2 hvy. melting	62.00	to	63.00
No. 1 dealer bundles	87.00	to	88.00
No. 1 factory bundles (auto)	90.00	to	91.00
No. 2 bundles	46.00	to	47.00
No. 1 busheling	83.00	to	84.00
Machine shop turnings	8.00	to	9.00
Shoveling turnings	44.00	to	45.00
Cast iron borings	43.00	to	44.00
Low phos. punchings plate	101.00	to	102.00
Heavy turnings	62.00	to	63.00
No. 1 RR hvy. melting	84.00	to	85.00
Rails, 2 ft. and under	95.00	to	96.00
Scrap rails, random lgth	82.00	to	83.00
RR specialties	95.00	to	96.00
No. 1 machinery cast	74.00	to	75.00
Cupola cast	67.00	to	68.00
Heavy breakable cast	30.00	to	31.00
Stainless			
18-8 bundles and solids	510.00	to	515.00
18-8 turnings	410.00	to	415.00

Chicago

No. 1 hvy. melting	$ 71.00	to	$ 72.00
No. 2 hvy. melting	67.00	to	65.00
No. 1 dealer bundles	84.00	to	85.00
No. 1 factory bundles (auto)	84.00	to	85.00
No. 2 dealer bundles	56.00	to	57.00
No. 1 busheling	78.00	to	79.00
Shredder scrap	78.00	to	79.00
Machine shop turnings	27.00	to	28.00
Mixed borings and turnings	22.00	to	23.00
Shoveling turnings	29.00	to	30.00
Cast iron borings	41.00	to	42.00
Low phos. forge crop	97.00	to	98.00
Low phos. punchings plate			
1/4 in. and heavier	112.00	to	113.00
Low phos. 2 ft. and under	106.00	to	107.00
No. 1 RR hvy. melting	75.00	to	76.00
Scrap rails random lgth	79.00	to	80.00
Reroller rails	104.00	to	105.00
Rails, 2 ft. and under	99.00	to	100.00
RR couplers and knuckles	90.00	to	91.00
RR car axles	106.00	to	107.00
No. 1 machinery cast	105.00	to	106.00
Cupola cast	92.00	to	93.00
Stove plate	97.00	to	98.00
Steel car wheels	87.00	to	88.00
Stainless			
18-8 bundles and solids	485.00	to	495.00
18-8 turnings	400.00	to	410.00
430 bundles and solids	125.00	to	135.00
430 turnings	85.00	to	95.00

Philadelphia

No. 1 hvy. melting	$ 71.00	to	$ 74.00
No. 2 hvy. melting	63.00	to	66.00
No. 1 dealer bundles	84.00	to	87.00
No. 2 dealer bundles	53.00	to	56.00
No. 1 busheling	83.00	to	86.00
Shredder scrap	83.00	to	86.00
Machine shop turnings	24.00	to	27.00
Mixed borings and turnings	24.00	to	27.00
Shoveling turnings	39.00	to	42.00
Low phos. 5 ft. and under	77.00	to	80.00
Low phos. 2 ft. punchings	93.00	to	96.00
Electric furnace bundles	85.00	to	88.00
RR specialties	76.00	to	79.00
Rails, 2 ft. and under	96.00	to	99.00
Cupola cast	85.00	to	88.00
Heavy breakable cast	53.00	to	56.00
No. 1 machinery cast	92.00	to	95.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00	to	$ 55.00
No. 2 hvy. melting	53.00	to	54.00
No. 1 dealer bundles	67.00	to	68.00
No. 2 bundles	33.00	to	34.00
No. 1 busheling	65.00	to	66.00
Drop forge flashings	42.00	to	43.00
Machine shop turnings	28.00	to	29.00
Mixed borings and turnings	8.00	to	9.00
Shoveling turnings	28.00	to	29.00
Cast iron borings	21.00	to	22.00
Heavy breakable cast	32.00	to	33.00
Mixed cupola cast	47.00	to	48.00
Automobile cast	71.00	to	72.00
Stainless			
18-8 bundles and solids	470.00	to	480.00
18-8 turnings	340.00	to	350.00
430 bundles and solids	115.00	to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 56.00	to	$ 57.00
No. 2 hvy. melting	54.00	to	55.00
No. 1 dealer bundles	72.00	to	73.00
No. 2 dealer bundles	32.00	to	33.00
Machine shop turnings	20.00	to	21.00
Shoveling turnings	20.00	to	21.00
Low phos. plate	71.00	to	72.00
Electric furnace bundles	60.00	to	61.00
Galvanized bundles	58.00	to	59.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00	to	$ 55.00
No. 2 hvy. melting	52.00	to	53.00
No. 1 dealer bundles	76.00	to	77.00
No. 1 factory bundles	75.00	to	76.00
No. 2 bundles	30.00	to	31.00
No. 1 busheling	66.00	to	67.00
Machine shop turnings	20.00	to	21.00
Shoveling turnings	20.00	to	21.00
Cast iron borings	18.00	to	19.00
Cut structural & plates,			
5 ft. and under	67.00	to	68.00
Cut structural & plates,			
2 ft. and under	88.00	to	89.00
Low phos. punchings plate	88.00	to	89.00
Foundry steel, 2 ft. & under	53.00	to	54.00
No. 1 RR hvy. melting	59.00	to	60.00
Rails, 2 ft. and under	88.00	to	89.00
Rails, 18 in. and under	90.00	to	91.00
No. 1 machinery cast	79.00	to	80.00
Mixed cast	46.00	to	47.00
Stainless			
18-8 bundles	470.00	to	480.00
18-8 turnings	345.00	to	355.00
430 bundles	120.00	to	130.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00	to	$ 52.00
No. 2 hvy. melting	41.00	to	42.00
No. 1 busheling	68.00	to	69.00
No. 1 dealer bundles	68.00	to	69.00
No. 2 bundles	29.00	to	30.00
Machine shop turnings	13.00	to	14.00
Mixed boring and turnings	13.00	to	14.00
Shoveling turnings	19.00	to	20.00
Cast iron borings	23.00	to	24.00
Low phos. plate	76.00	to	77.00
Structural and plate,			
2 ft. and under	77.00	to	78.00
Rails, 2 ft. and under	75.00	to	76.00
Scrap rails, random lgth	61.00	to	62.00
No. 1 machinery cast	74.00	to	75.00
No. 1 cupola cast	71.00	to	72.00

St. Louis

No. 1 hvy. melting	$ 69.00	to	$ 70.00
No. 2 hvy. melting	52.00	to	53.00
No. 1 busheling	79.00	to	80.00
No. 1 dealer bundles	79.00	to	80.00
No. 2 bundles	46.00	to	47.00
Machine shop turnings	17.00	to	18.00
Shoveling turnings	21.00	to	22.00
Cast iron borings	27.00	to	28.00
No. 1 RR hvy. melting	74.00	to	75.00
Rails, random length	74.00	to	75.00
Rails, 18 in. and under	97.00	to	98.00
RR specialties	74.00	to	75.00
Cupola cast	69.00	to	70.00
Heavy breakable cast	43.00	to	44.00
Stove plate	89.00	to	90.00
Steel car wheels	78.00	to	79.00
Rerolling rails	99.00	to	100.00
Unstripped motor blocks	54.00	to	55.00

Birmingham

No. 1 hvy. melting	$ 68.00	to	$ 69.00
No. 2 hvy. melting	64.00	to	65.00
No. 1 dealer bundles	68.00	to	69.00
No. 2 bundles	44.00	to	45.00
No. 1 busheling	68.00	to	69.00
Shredder scrap	86.00	to	87.00
Machine shop turnings	23.00	to	24.00
Shoveling turnings	36.00	to	37.00
Cast iron borings	36.00	to	37.00
Electric furnace bundles	65.00	to	66.00
Elec. furnace, 3 ft. & under	68.00	to	69.00
Structural and plate, 2 ft.	87.00	to	88.00
Structural and plate, 4 ft.	81.00	to	82.00
No. 1 RR hvy. melting	81.00	to	82.00
Scrap rails, random lgth	70.00	to	71.00
Rails, 2 ft. and under	85.00	to	86.00
Angles and splice bars	81.00	to	82.00
No. 1 cupola cast	82.00	to	83.00
Unstripped motor blocks	72.00	to	73.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00	to	$ 51.00
No. 2 hvy. melting	49.00	to	50.00
No. 1 dealer bundles	69.00	to	70.00
No. 2 bundles	32.00	to	33.00
Machine shop turnings	9.00	to	10.00
Shoveling turnings	12.00	to	13.00
Cast iron borings	19.00	to	20.00
Low phos. 18 in. and under	75.00	to	76.00
Rails, random length	59.00	to	60.00
Rails, 2 ft. and under	75.00	to	76.00
No. 1 cupola cast	64.00	to	65.00
Heavy breakable cast	25.00	to	26.00
Drop broken cast	68.00	to	69.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 40.00	to	$ 42.00
No. 2 hvy. melting	33.00	to	34.00
No. 2 dealer bundles	20.00	to	24.00
Mixed borings and turnings	10.00	to	11.00
Machine shop turnings	4.00	to	6.00
Shoveling turnings	10.00	to	12.00
Clean cast chem. borings	35.00	to	36.00
No. 1 machinery cast	79.00	to	80.00
Mixed yard cast	50.00	to	51.00
Heavy breakable cast	10.00	to	12.00
Stainless			
18-8 prepared solids	440.00	to	460.00
18-8 turnings	340.00	to	360.00
430 prepared solids	90.00	to	100.00
410 solids	75.00	to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00	to	$ 51.00
No. 2 hvy. melting	39.00	to	41.00
No. 1 dealer bundles	50.00	to	52.00
No. 2 bundles	32.00	to	34.00
No. 1 busheling	56.00	to	58.00
Shredder scrap	59.00	to	61.00
Machine shop turnings	12.00	to	14.00
Shoveling turnings	18.00	to	20.00
No. 1 machinery cast	72.00	to	77.00
Mixed cupola cast	44.00	to	46.00
Heavy breakable cast	8.00	to	10.00

San Francisco

No. 1 hvy. melting	$ 40.00	to	$ 42.00
No. 2 hvy. melting	34.00	to	36.00
No. 1 dealer bundles	31.00	to	33.00
No. 2 dealer bundles	20.00	to	21.00
Machine shop turnings	8.00	to	9.00
Cast iron borings	8.00	to	9.00
No. 1 cupola cast	80.00	to	82.00

Los Angeles

No. 1 hvy. melting	$ 34.00	to	$ 36.00
No. 2 hvy. melting	28.00	to	30.00
No. 1 dealer bundles	26.00	to	28.00
No. 2 dealer bundles	16.00	to	18.00
Machine shop turnings	9.00	to	10.00
Shoveling turnings	10.00	to	11.00
Cast iron borings	8.00	to	9.00
Elec. furnace, 1 ft. and under			
(foundry)	67.00	to	69.00
No. 1 cupola cast	72.00	to	74.00

Seattle

No. 1 hvy. melting	60.00	to	62.00
No. 2 hvy. melting	51.00	to	53.00
No. 2 bundles	35.00	to	37.00
No. 1 cupola cast	89.00	to	90.00
Mixed yard cast	80.00	to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 76.00
No. 2 hvy. melting, cut 2 ft. and under	67.00
No. 1 dealer bundles	82.00
No. 2 bundles	58.00
Mixed steel scrap	53.00
Bush. new fact. prep'd	77.00
Bush. new fact. unprp'd	60.00
Machine shop turnings	30.00
Short steel turnings	30.00
Mixed borings and turnings	19.00
Cast scrap	97.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 59.00	to	$ 60.00
No. 2 hvy. melting	49.00	to	50.00
No. 2 bundles	33.00	to	34.00
Machine shop turnings	11.00	to	12.00
Crushed turnings	24.00	to	25.00
Shredder scrap	67.00	to	68.00
Cut structural plate, 2 ft. and under	91.00	to	92.00
Cut structural plate, 5 ft. and under	67.00	to	68.00
Unstripped motor blocks	54.00	to	55.00
Cupola cast	81.00	to	82.00

PRICES CONTINUE ON A TRIP TO NOWHERE

Prices are supposed to go up or down. But in June, prices of producer goods simply stalled. During the month, the U.S. Labor Dept.'s price index showed an aggregate 'no change.'

That was the first zero-change reading in the 12-month period that ended at the close of June. During that period, prices of producers finished goods went up six times and down six times.

Noted Labor Dept. analysts in the June price report: "In the first half of 1986, prices received by domestic producers of goods at all stages of processing declined at rates not experienced since 1949."

The analysts went on to note that the producer price index for finished goods decreased at an annual rate of 6.5 pct in the first half. Prices for intermediate goods decreased at a rate of 8.3 pct and prices of crude materials moved down at a seasonally adjusted annual rate of 20.9 pct.

The big price suppressor in that first half, of course, was tumbling energy prices. Big cuts in those tags pulled down all the averages.

Prices of capital goods, despite the slump in industries making those goods, have lately held their ground. Over the last five months ending in June, tags on capital goods have gone up steadily, if moderately.

Price softness in metalworking industry products was widespread in June—as it has been since the start of the year. For example, note in the table here under price changes from May to June, seven product lines scored price declines. Another three lines showed no price changes. And among those product lines showing price hikes, in eight of those lines the price changes were less than 0.2 pct.

Latest Month Covered: June 1986

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	403.1	+ 0.7	+ 1.5
Metal Forming Machine Tools	439.6	+ 0.2	+ 1.4
Agricultural Machinery & Equip.	339.9	+ 0.1	+ 0.4
Construction Machinery & Equip.	366.9	+ 0.2	+ 1.4
Oil and Gas Field Machinery	418.3	− 1.3	− 1.8
Industrial Material Handling Equip.	295.9	− 0.2	+ 0.3
Pumps, Compressors & Allied Equip.	361.1	+ 0.4	+ 1.3
Mining Machinery & Equipment	381.0	+ 0.3	+ 0.3
Mechanical Power Transmission Equip.	343.6	+ 0.1	+ 1.1
Automobiles	232.9	− 0.2	+ 1.8
Motor Trucks—Light	311.1	− 0.6	+ 6.0
Motor Trucks—Heavy	342.8	− 0.3	+ 2.9
Railroad Equipment	364.5	0	+ 0.2
Fabricated Metal Structural Products	315.6	+ 0.2	+ 0.3
Electric Motors	349.6	− 0.6	− 0.7
Valves & Fittings (Dec. 1982 = 100)	106.6	0	+ 1.6
Ball & Roller Bearings	356.0	+ 0.1	+ 1.0
Foundry & Forge Shop Products	364.5	− 0.1	+ 0.2
Heating Equipment	269.7	+ 1.1	+ 3.9
Plumbing Fixtures & Brass Fittings	324.2	+ 0.4	+ 3.6
Metal Containers	361.0	0	0
Internal Combustion Engines	353.3	+ 0.2	+ 1.8

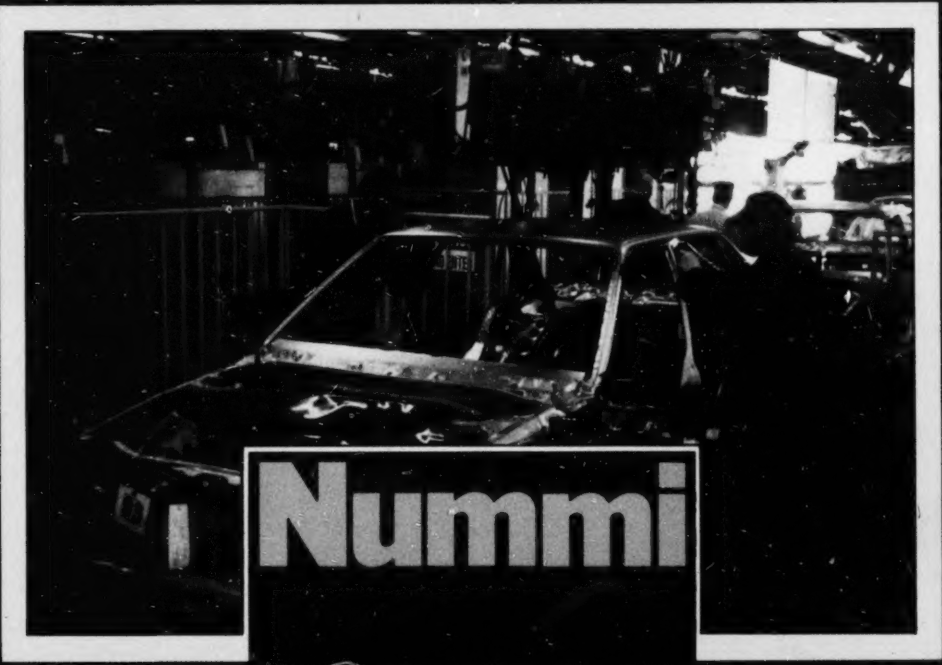
Data based on U.S. Labor Dept.'s Producer Price Index

IRON AGE EPTEMBER 5, 1986

10/16/86 C2150-8

MANUFACTURING MANAGEMENT

What Makes the



Nummi Plant Different

To Tighten Shop Floor Control

Metal Matrix Composites: The Next Big Step

SEPTEMBER 5, 1986 VOL. 229, NO. 17

IRON AGE
MANUFACTURING MANAGEMENT

Departments

EDITORIAL STAFF **6**
LETTERS **6**
INDUSTRIAL BRIEFS **22**
PRODUCT & EQUIPMENT REVIEW **46**
FREE LITERATURE **52**
FYI **58**
MANAGEMENT SERVICE CARD **59**
AD INDEX **61**
P&P DATA 8/11 **62**
FERROUS SCRAP 8/11 **65**
CLEARING HOUSE **66**
BUSINESS STAFF **67**

Editorial **5**
Now about all those concessions.

Newswatch **13**
Reagan faces an uphill fight against trade legislation.

You and Your Job **25**
Aging of America is urging employer-sponsored *eldercare*.

NUMMI **27**
GM/Toyota venture drives home the importance of the workforce.

Metal Matrix **35**
Composites are going after the commercial market.

Inland Steel **39**
The steelmaker turns to suppliers for purchasing power.

Shop Floor Control **41**
Realtrac: A speed demon in real-time.

Materials Report **56**
USX stoppage causes order pickup for sheet producers.

Order Trends **68**
Crosscurrents roil the flow of orders.

Next Issue: In Pursuit of Quality—Fastening.

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$52 one year, $85 Canada/Foreign (24 issues). Metalsproducer edition—$30 one year, $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 2040, Radnor, PA, 19089.

Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES

PRICE & PRODUCTION DATA

(Effective August 11,1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	143	130	159	173
Pittsburgh	156	176	161	167
Youngstown	105	97	93	93
Lake Erie	94	84	100	120
Detroit	119	122	127	135
Chicago	277	298	386	466
Midwest	139	134	159	147
Southern	136	135	171	206
Western	43	61	81	84
U.S. Production	1,211	1,237	1,437	1,591

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢–Mineral Services, 8/13/85. **59.4¢–Inland Steel Mining, 1/1/85 and Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢–U.S.Steel, 8/16/85. 86.9¢–Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective August 11,1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,211	1,237	52,843	53,902
Capability Utilization Rate	50.0	51.0	67.7	66.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 5/19/86)	24.850	24.850	24.850	27.582
Pig Iron** (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 75.17	$ 74.83	$ 71.83	$ 74.17
No. 2 bundles	$ 53.83	$ 53.83	$ 52.50	$ 53.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 76.50	$ 75.50	$ 71.50	$ 77.50
No. 1 steel, Philadelphia	73.50	73.50	72.50	72.50
No. 1 steel, Chicago	75.50	75.50	71.50	72.50
No. 1 bundles, Detroit	72.50	69.50	66.50	69.50
Low Phos., Youngstown	74.50	74.50	71.50	70.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	93.50
No. 1 mach'y cast., Chi	105.50	105.50	105.50	99.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective August 11,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	50.67	51.07	8/11/86
Copper (C)	61.50-64.00	62.00-64.00	8/ 6/86
Lead	21.25-24.00	21.00-24.00	8/11/86
Magnesium Ingot	153.00	148.00	12/ 9/85
Nickel (LME)	175.91	177.92	8/11/86
Zinc	44.00	41.00-44.00	7/30/86

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$248.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$388.00
Indium, dollars per troy oz.	$2.65
Iridium, dollars per troy oz.	$415.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$230.00-240.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.25
Palladium, per troy oz.	$125.00
Platinum, per troy oz.	$501.00
Rhodium, per troy oz.	$1,195.00
Silver ingots, per troy oz.	$5.51
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

August 4—247.92
August 5—241.72
August 6—245.57
August 7—244.99
August 8—244.49

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	58	51
Yellow brass	50	46½
Red brass	53	48
Comm. bronze	54	48¼
Mang. bronze	42	41
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	44
Light copper	36

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	40
Light copper	32
No. 1 composition	45
No. 1 comp. turnings	44
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	25
Radiators	35

Aluminum

New mixed clips	34	— 35
Old sheet	32	— 33
Old cast	32	— 33
Clean dry borings	33	— 34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	28	— 29
Mixed L.C. clips	26	— 27
Old sheets and cast	23	— 24
Borings and turnings	20	— 21
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 47
No. 2 copper wire	36	— 37
Light copper	31	— 33
Radiators	26	— 27
No. 1 composition	36	— 37
No. 1 composition turnings	34	— 35
Cocks and faucets	27	— 28
Clean heavy yellow brass	25	— 26
Brass Pipe	27	— 28
New soft brass clippings	37	— 39

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	25	— 35

Zinc

New zinc clippings	16	— 17
Old diecast zinc	12	— 13

EFFECTIVE AUGUST 11, 1986

(Effective August 11,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 76.00 to	$ 77.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	93.00 to	94.00
No. 1 factory bundles (auto)	94.00 to	95.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	87.00 to	88.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	44.00 to	45.00
Cast iron borings	43.00 to	44.00
Low phos. punchings plate	104.00 to	105.00
Heavy turnings	66.00 to	67.00
No. 1 RR hvy. melting	84.00 to	85.00
Rails, 2 ft. and under	95.00 to	96.00
Scrap rails, random lgth	82.00 to	83.00
RR specialties	95.00 to	96.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	510.00 to	515.00
18-8 turnings	410.00 to	415.00

Chicago

No. 1 hvy. melting	$ 75.00 to	$ 76.00
No. 2 hvy. melting	71.00 to	72.00
No. 1 dealer bundles	93.00 to	94.00
No. 1 factory bundles (auto)	91.00 to	92.00
No. 2 dealer bundles	60.00 to	61.00
No. 1 busheling	86.00 to	87.00
Shredder scrap	83.00 to	84.00
Machine shop turnings	27.00 to	28.00
Mixed borings and turnings	22.00 to	23.00
Shoveling turnings	29.00 to	30.00
Cast iron borings	41.00 to	42.00
Low phos. forge crop	97.00 to	98.00
Low phos. punchings plate 1/4 in. and heavier	115.00 to	116.00
Low phos. 2 ft. and under	110.00 to	111.00
No. 1 RR hvy. melting	77.00 to	78.00
Scrap rails random lgth	79.00 to	80.00
Reroller rails	104.00 to	105.00
Rails, 2 ft. and under	99.00 to	100.00
RR couplers and knuckles	90.00 to	91.00
RR car axles	106.00 to	107.00
No. 1 machinery cast	105.00 to	106.00
Cupola cast	92.00 to	93.00
Stove plate	99.00 to	100.00
Steel car wheels	91.00 to	92.00
Stainless		
18-8 bundles and solids	475.00 to	485.00
18-8 turnings	380.00 to	390.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 72.00 to	$ 75.00
No. 2 hvy. melting	64.00 to	67.00
No. 1 dealer bundles	86.00 to	89.00
No. 2 dealer bundles	53.00 to	56.00
No. 1 busheling	84.00 to	87.00
Shredder scrap	83.00 to	86.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	79.00 to	82.00
Low phos. 2 ft. punchings	93.00 to	96.00
Electric furnace bundles	90.00 to	93.00
RR specialties	79.00 to	82.00
Rails, 2 ft. and under	96.00 to	99.00
Cupola cast	85.00 to	88.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 57.00 to	$ 58.00
No. 2 hvy. melting	56.00 to	57.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	35.00 to	36.00
No. 1 busheling	70.00 to	71.00
Drop forge flashings	44.00 to	45.00
Machine shop turnings	28.00 to	29.00
Mixed borings and turnings	8.00 to	9.00
Shoveling turnings	28.00 to	29.00
Cast iron borings	22.00 to	23.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	47.00 to	48.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	460.00 to	470.00
18-8 turnings	330.00 to	340.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 57.00 to	$ 58.00
No. 2 hvy. melting	55.00 to	56.00
No. 1 dealer bundles	75.00 to	76.00
No. 2 dealer bundles	33.00 to	34.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Low phos. plate	74.00 to	75.00
Electric furnace bundles	63.00 to	64.00
Galvanized bundles	60.00 to	61.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	80.00 to	81.00
No. 1 factory bundles	76.00 to	77.00
No. 2 bundles	31.00 to	32.00
No. 1 busheling	70.00 to	71.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	20.00 to	21.00
Cut structural & plates, 5 ft. and under	71.00 to	72.00
Cut structural & plates, 2 ft. and under	92.00 to	93.00
Low phos. punchings plate	92.00 to	93.00
Foundry steel, 2 ft. & under	54.00 to	55.00
No. 1 RR hvy. melting	60.00 to	61.00
Rails, 2 ft. and under	89.00 to	90.00
Rails, 18 in. and under	91.00 to	92.00
No. 1 machinery cast	80.00 to	81.00
Mixed cast	47.00 to	48.00
Stainless		
18-8 bundles	460.00 to	470.00
18-8 turnings	335.00 to	345.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 busheling	68.00 to	69.00
No. 1 dealer bundles	68.00 to	69.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	13.00 to	14.00
Mixed boring and turnings	13.00 to	14.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	23.00 to	24.00
Low phos. plate	76.00 to	77.00
Structural and plate, 2 ft. and under	77.00 to	78.00
Rails, 2 ft. and under	75.00 to	76.00
Scrap rails, random lgth	61.00 to	62.00
No. 1 machinery cast	74.00 to	75.00
No. 1 cupola cast	71.00 to	72.00

St. Louis

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	55.00 to	56.00
No. 1 busheling	82.00 to	83.00
No. 1 dealer bundles	83.00 to	84.00
No. 2 bundles	49.00 to	50.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	27.00 to	28.00
No. 1 RR hvy. melting	79.00 to	80.00
Rails, random length	74.00 to	75.00
Rails, 18 in. and under	97.00 to	98.00
RR specialties	79.00 to	80.00
Cupola cast	69.00 to	70.00
Heavy breakable cast	43.00 to	44.00
Stove plate	89.00 to	90.00
Steel car wheels	78.00 to	79.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	54.00 to	55.00

Birmingham

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	70.00 to	71.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	36.00 to	37.00
Electric furnace bundles	67.00 to	68.00
Elec. furnace, 3 ft. & under	70.00 to	71.00
Structural and plate, 2 ft.	89.00 to	90.00
Structural and plate, 4 ft.	83.00 to	84.00
No. 1 RR hvy. melting	83.00 to	84.00
Scrap rails, random lgth	73.00 to	74.00
Rails, 2 ft. and under	90.00 to	91.00
Angles and splice bars	83.00 to	84.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	72.00 to	73.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	77.00 to	78.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	75.00 to	76.00
No. 1 cupola cast	64.00 to	65.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	68.00 to	69.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	33.00 to	34.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	430.00 to	450.00
18-8 turnings	330.00 to	350.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 51.00
No. 2 hvy. melting	39.00 to	41.00
No. 1 dealer bundles	50.00 to	52.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	56.00 to	58.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	72.00 to	77.00
Mixed cupola cast	44.00 to	46.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	20.00 to	21.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 34.00 to	$ 36.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	67.00 to	69.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 74.00
No. 2 hvy. melting, cut 2 ft. and under	66.00
No. 1 dealer bundles	82.00
No. 2 bundles	58.00
Mixed steel scrap	53.00
Bush. new fact. prep'd	77.00
Bush. new fact. unprp'd	60.00
Machine shop turnings	30.00
Short steel turnings	30.00
Mixed borings and turnings	19.00
Cast scrap	97.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 62.00 to	$ 63.00
No. 2 hvy. melting	52.00 to	53.00
No. 2 bundles	33.00 to	34.00
Machine shop turnings	13.00 to	14.00
Crushed turnings	24.00 to	25.00
Shredder scrap	70.00 to	71.00
Cut structural plate, 2 ft. and under	88.00 to	89.00
Cut structural plate, 5 ft. and under	70.00 to	71.00
Unstripped motor blocks	54.00 to	55.00
Cupola cast	81.00 to	82.00

CROSSCURRENTS ROIL FLOW OF ORDERS

The flow of new orders to durable goods producers has become bumpy. Orders, from month to month, have been caught in some strong crosscurrents.

Overall, the orders picture in June showed no signs of the turbulence that is occurring in individual industry patterns. Durable goods orders, at $102.7 billion, were off a slight 0.1 pct from May.

However, as U.S. Commerce Dept. analysts noted in the June report, "There were large offsetting movements" in orders during the month. For example, orders for electrical machinery rose a whopping 23 pct to $18.0 billion. Orders for transportation equipment fell a resounding 16 pct to $23.5 billion.

In the case of orders for electrical machinery, most of the rise was due to a strong showing in communications equipment, much of the business directed to defense industries. In the transportation equipment sector, the decline in orders centered in the aircraft and parts industry—in orders to defense industries.

The whiplashing of the overall orders pattern by defense contracts seems to be the force behind the strong crosscurrents.

Still, a pattern has been discernable for some time in orders for manufactured goods. There has been a moderate but steady decline since a high in December of $201.2 billion. An exception was a 0.1 pct increase in April.

Why the long, slow decline in orders as the U.S. economy continues to expand?

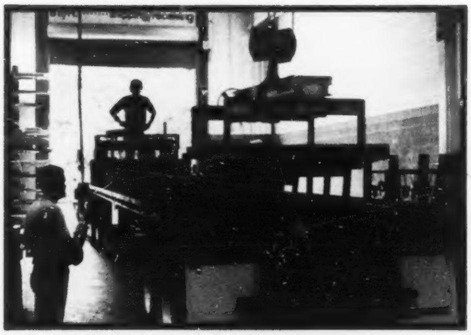
There's no agreed-on answer to that question. But not to be overlooked in any attempt to find an answer is the strong recent rise in the U.S. trade deficit in manufactured goods.

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted Source: U.S. Dept of Commerce		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	2nd Q*	$387.4	$376.1	$387.8
Manufacturing, Total	2nd Q*	148.0	143.1	154.3
Manufacturing, Durable Goods	2nd Q*	72.2	67.7	74.0
Mining Industry	2nd Q*	12.6	12.9	16.5
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	June	102.7	102.6	106.8
Shipments	June	104.2	103.7	102.7
Inventories	June	187.2	187.6	192.2
Unfilled Orders	June	354.2	355.7	349.2
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	June	26.5	26.2	28.0
Capital Goods Producers Defense Industries	June	7.3	8.4	11.2
Primary Metals, Total	June	9.3	8.8	10.7
Steel (SIC 331)	June	3.8	3.4	4.3
Iron & Steel Castings (SIC 332)	June	1.2	1.2	1.0
Nonferrous Metals	June	4.3	4.2	5.2
Nonelectrical Mach.-Equip. Industries, Total	June	16.9	16.4	17.8
Engines & Turbines	June	1.2	1.1	1.5
Farm Mach.& Equipment (Shipments)	June	0.8	0.8	0.8
Construction, Mining & Mat. Hdlg. Equip	June	2.5	2.8	2.8
General Industrial Machinery	June	1.6	1.5	1.5
Metalworking Machinery	June	0.7	0.9	1.0
Machine Tools, Total ($Mill.)**	June	201.1	206.2	235.2
Machine Tools, Metalcutting**	June	156.8	141.7	182.9
Machine Tools, Metalforming**	June	44.3	64.5	52.3
Electrical Mach. & Equip. Industries, Total	June	18.0	14.7	16.2
Elec. Transmission & Ind. Equip.	June	2.0	1.9	2.0
Household Appliances	June	1.5	1.4	1.5
Communication Equipment	June	7.0	4.6	6.7
Transportation Equipment,Total	June	23.5	28.0	28.3
Motor Vehicles & Parts (Shipments)	June	16.4	17.0	15.3
Aircraft, Missiles & Parts	June	5.3	10.0	10.6
Shipbuilding & Military Tanks	June	1.0	0.3	1.4
Fabricated Metal Products, Total	June	14.0	14.0	13.4
Instruments, Total	June	4.6	4.7	4.8

*Est.—Commerce Dept. **Source: NMTBA

10/16/86 C2150-8

IRON AGE
SEPTEMBER 19, 1986
MANUFACTURING MANAGEMENT



The Many Facets of Just-in-Time

How to Deliver Just-In-Time, Just-In-Time

Just-In-Time Manufacturing: Much More Than Reducing Inventories

In Pursuit of Quality: Fastening

SEPTEMBER 19, 1986 VOL. 229, NO. 18

IRON AGE
MANUFACTURING MANAGEMENT

Editorial 7
Are futurists a thing of the past?

Newswatch 15
Senate Democrats push for quick action on trade legislation.

You and Your Job 27
Work teams can punch up productivity.

Capital Spending 31
Plant and equipment outlays by U.S. manufacturers have slipped.

Just-In-Time 36
Though its concepts are easy to understand, implementation is a bear.

Just-In-Time 45
Suppliers are integrating their production with the automakers.

Fastening 51
How quality control can reduce the high cost of fastening.

Materials Report 63
Price hikes and pay cuts could produce steel profits.

Price Trends 68
How low will prices go?

Next Issue: Fourth Quarter Forecast.

Departments

EDITORIAL STAFF 8
LETTERS 8
PRODUCT & EQUIPMENT REVIEW 56
FYI 58
MANAGEMENT SERVICE CARD 59
AD INDEX 61
BUSINESS STAFF 61
FREE LITERATURE 62
P&P DATA 8/25 64
FERROUS SCRAP 8/25 65
CLEARING HOUSE 66

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition – $52 one year, $85 Canada/Foreign (24 issues). Metalsproducer edition – $30 one year, $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 2040, Radnor, PA, 19089.

Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES

WHY IS PLANT SPENDING SICK?

BY JOHN D. BAXTER

Though the economy's moving ahead, plant and equipment outlays by U.S. manufacturers have slipped from slow-ahead to reverse.

Everybody knows that plant and equipment spending by U.S. manufacturers has gone into a slide. A cooling trend noted last year has accelerated into an outright slide in spending so far this year.

Still, answers to the 'why' of this slide have remained elusive.

A look at the chart here puts in perspective the timing and extent of the slide. This spending, in real dollars, grew by almost 19 pct in 1984. The boom cooled sharply last year as outlays grew by 8.8 pct. And for this year, based on an April/May U.S. Commerce Dept. survey of executives and their spending plans, it appears these outlays will actually decline from the 1985 level by 4.1 pct.

The slowdown in actual outlays may be recent, but it reflects a long, steady souring of attitudes of manufacturing executives about plant investment. In an October-November 1985 survey, they told Commerce they would cut back their plant expenditures this year by 0.8 pct. Then, in a January-March survey, they said they would instead cut back by 1.9 pct. Then, in the noted April-May survey, they pulled down their 1986 spending sights even further; they would spend 4.1 pct less than last year.

More than that, the latest Conference Board quarterly survey of capital appropriations by the nation's 1,000 largest manufacturers shows a drop of 18 pct from the first quarter a year ago. Notably, appropriations give a picture of actual spending that lies ahead.

All this tumbling, and outlook for more tumbling, in plant spending is taking place as the U.S. economy expands. For example, plant spending by manufacturers in the second quarter of this year was down 3.8 pct from the year-ago period. In the same period, the U.S. economy (GNP) went up by 5.5 pct.

While everybody knows about, and talks about, the slide in capital spending, there is no consensus on just why these outlays have come on hard times. From bars to boardrooms, the fall of plant spending has reportedly stirred up lively debates. (Bars are said to be a debate forum because good-paying jobs at plants are at stake when companies invest, or don't invest, in those plants).

The cause of the spending lag is more than the matter of business concern about the loss of tax incentives on investment under the new tax bill or the low operating rates of factories. Those are but two factors among several.

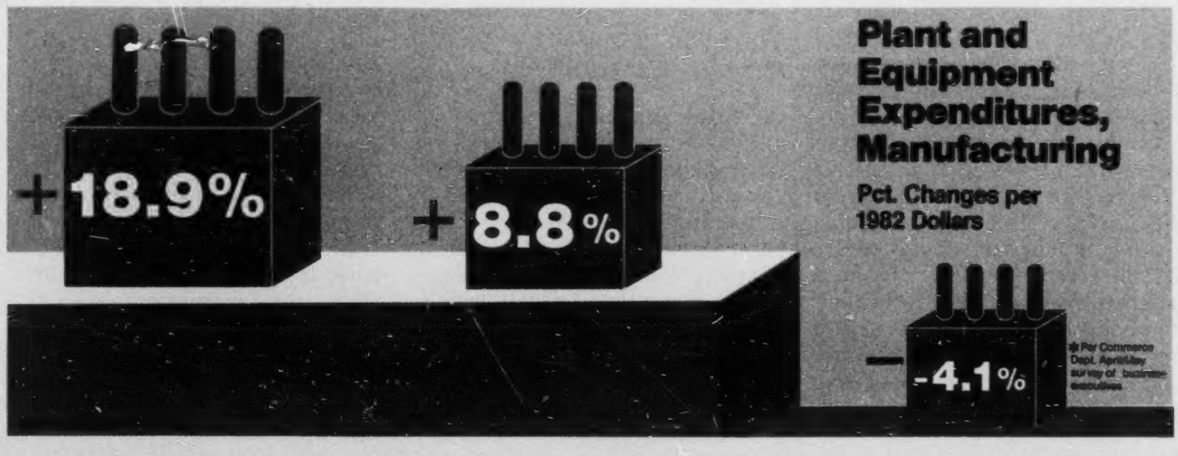
The trend in plant spending is not going by the book. Economists point out that, based on almost unbroken precedent, these outlays should be rising—at a clip equal to or greater than the growth rate for the economy.

The most often mentioned reason for slowed spending centers on upcoming business tax changes. The proposed tax bill will undercut investment incentives, especially since it is retroactive to the start of this year.

That certainly can't help business investment now.

Still, other observers look to what is actually happening on the manufacturing scene to explain the slide in capital expenditures.

(Cont. on p. 32.)



For one, they note that factory output has long been on a flat, or even a down trend for some time now. This output in manufacturing in the second quarter this year was 0.1 pct below what it was in the year-ago quarter.

Certainly, managers, at any company where meeting production volume requirements is not a problem, aren't giving high priority to new equipment.

More Reasons

Another favorite reason cited for the plant spending lag relates to the low output trend. Manufacturers simply are not using enough of their existing plant capacity to warrant running out and buying more capital equipment. The plant utilization rate in manufacturing in the second quarter this year was off 1.4 percentage points from the 79.1 pct rate in the second quarter last year. In the especially hard-hit sector of durable goods manufacturing, this rate was down 2.5 percentage points to 76.0 pct of capacity.

Again, here is a trend that clearly works against any ideas for stepping up investment in new plant and equipment.

Less often cited as a reason for poor levels of plant spending has been the persistent sluggishness in the flow of new orders to manufacturers. Simply, if manufacturers don't have a solid inflow of orders, plant production volume and utilization rates can't be expected to fare very well. So, the rate of orders flow is a base determiner of how busy plants are and, as much as anything, shapes the investment attitudes of managers.

New orders received by manufacturers in the second quarter of this year were off by 0.6 pct from the orders volume in the same quarter a year ago. Those orders in the second quarter ran at a monthly average of $193.7 billion.

Among those observers with a financial bent, a favorite explanation for the lag in capital spending is the weakness in corporate profits. Certainly, profits of manufacturers have tumbled. Between 1984 and 1985, net earnings of manufacturers fell 16.5 pct to $73 billion. And, continuing the trend, these earnings were down 1.4 pct in the second quarter this year compared to the second period of last year.

"Making money, but not enough," said one financial executive at a Midwest metals fabricating company.

"These days," he added, "the big capital spending bucks have to come from company earnings. Interest rates may be low and invite borrowing to invest, but balance sheets at a lot of companies are in bad shape; corporate debt is still too high."

The worldwide slump in oil prices has been a factor leading to cutbacks in capital spending. These low prices have hit big-tag spending for drilling rigs, pipeline projects, refineries and other oil country capital goods. Some observers feel this is the 'heart of the problem' in accounting for the recent, and continuing, declines in business capital spending.

Capital outlays by the huge petroleum industry are important, of course. However, even when this spending is excluded from the trend in plant outlays, the direction of overall spending is still downward. For example, The Conference Board's capital appropriations survey showed a year-to-year decline of 18 pct as of the first quarter. But when petroleum industry setasides were excluded, these appropriations were still down by almost 14 pct.

A Wider Search

More economists these days are saying that to find the causes of capital spending weakness, it is necessary to look beyond short-term factors. Low plant operating rates, the oil slump and other short-term spending depressants have an impact, but long-term patterns are now heavily influencing spending patterns.

Over the short run, fast cyclical growth tends to override negative long-term influences on spending. However, when the short-term business cycle is caught up in sluggish growth, as at present, then long-term negative investment factors tend to loom big.

So, the search for answers on the current deep and worsening lag in plant outlays goes beyond today's short-term factors.

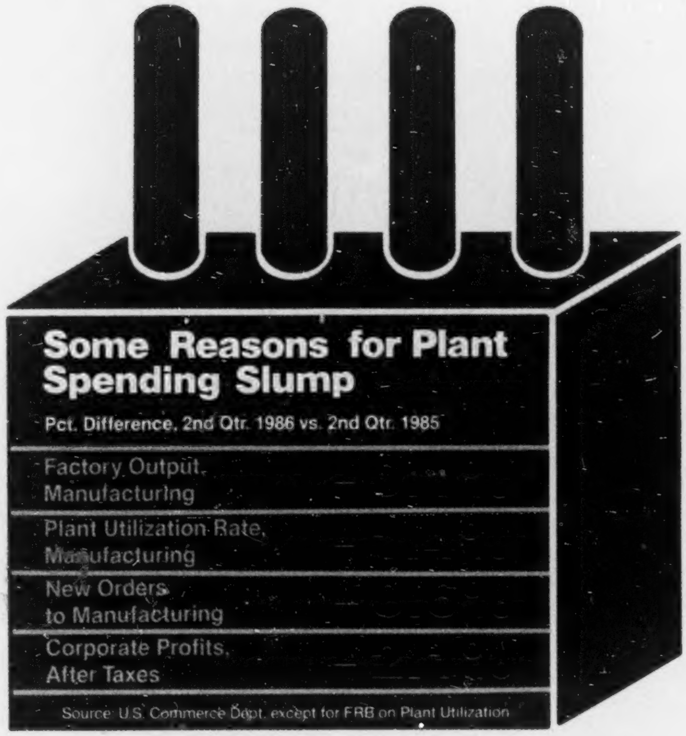
For one, the sharp rise in imports in recent years has hammered plant spending in this country. In 1970, imports of capital goods accounted for 7 pct of the U.S. market for these goods. Last year, these imports gobbled up 20 pct of the U.S. market for capital goods. These facts make it clear that the U.S. plant spending lag is hitting domestic capital goods producers harder than published figures would indicate.

At a time when spending for new plant and equipment is already lagging, and more of what there is goes to overseas suppliers, then the impact on U.S. capital goods producers is quite apparent.

Further, the import situation is so severe that it actually slows the U.S. economy itself—which, in turn, lessens demand for new capital equipment. In commenting on the recent slowdown of the economy, Charls E. Walker, a former Treasury deputy secretary, stated flatly, "The economy is sluggish because too much domestic demand is diverted to goods produced abroad."

It is a popular notion that foreign competition acts as a spur to U.S. manufacturers to acquire new equipment in order to better compete and defend their markets. But apparently import competition—at least when it becomes overwhelming—works another way, too. Faced with shrunken market shares, many U.S. manufacturers have pulled back on their capital spending. They have either not seen the need or can't afford new plant and equipment.

For example, back in 1980 and 1981, when U.S. manufacturers ran up trade *surpluses* totaling



Some Reasons for Plant Spending Slump

Pct. Difference, 2nd Qtr. 1986 vs. 2nd Qtr. 1985

Factory Output, Manufacturing	[illegible]
Plant Utilization Rate, Manufacturing	[illegible]
New Orders to Manufacturing	[illegible]
Corporate Profits, After Taxes	[illegible]

Source: U.S. Commerce Dept. except for FRB on Plant Utilization

more than $20 billion, they pushed up their plant spending about 11 pct each year. But in the first half of this year, U.S. manufacturers, buried by a landslide trade deficit of $65 billion, told the Commerce Dept. they would cut back their plant spending this year.

Diverted Funds

There is still another trend of recent years that has hurt business capital investment in this country. It is a force at work right now in putting a lid on manufacturers' investment in new production facilities.

The force is the many mergers and acquisitions that often divert corporate funds from plant spending. A growing number of companies have sought corporate growth through acquisitions rather than through putting the latest equipment on line and grow through internal effort.

One merger broker recently declared that the cheapest way for a corporation to acquire added productive capacity and capability was through acquisition of other companies or plants.

In 1984, U.S. corporations, according to the merger consultant firm W.T. Grimm & Co., expended $122 billion in making acquisitions. In that same year, corporations spent $354 billion for new plant and equipment. Last year, corporations laid out $180 billion for acquisitions and $386 billion for plant spending.

So, corporate spending for acquisitions, as a pct of capital expenditures amounted to 35 pct in 1984 and 46 pct last year. Years ago, there was no such diversion of corporate funds from potential plant spending—certainly not in such magnitude.

Another rapidly rising use of corporate funds that impacts on plant outlays is the huge amounts spent by companies to buy back their own outstanding stock.

Back in 1981, when plant spending rose by a strong 11.5 pct, corporate buybacks of stock totaled $3.6 billion. In the first half this year, as plant spending started to sag, corporate buybacks amounted to more than $19 billion. Last year, these stock buyback outlays came to $37 billion.

"Stock buy-backs," explained one security analyst, "can often make a company's earnings per share look a lot better—and more quickly so—than an equivalent amount spent in buying updated equipment to improve operations. So, given a choice, you can see why companies often opt to put so much into buy-backs—to the neglect of plant investment."

Restructuring

There is another relatively long-term factor that is now impacting on plant spending by U.S. manufacturers. That factor is the great restructuring—mostly contraction—going on in a number of industries. This development holds true especially for basic goods industries. And those industries, capital-intensive as they are, have been in the past among the biggest buyers of capital goods.

The domestic steel industry offers a clear illustration of the impact of long-term contraction on plant spending. In the years 1979-80, raw steel production of U.S. mills averaged 124 million net tons per year. The industry contracted, and in the years 1984-85 raw steel output averaged 90 million tons per year. How was this industry's capital spending affected? These outlays fell to an average $1.4 billion per year in the recent years period from $2.5 billion per year in the earlier period—a 44 pct drop.

Add up the short-term pressures on plant spending—and the special long-term pressures—and it becomes clear why these outlays are presently so weak even as the U.S. economy continues to expand. As one economist has noted, "There are super-cycle forces working against plant expenditures that are often overlooked by we analysts." □

PRICE & PRODUCTION DATA

(Effective August 25,1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	134	142	174	168
Pittsburgh	168	154	188	165
Youngstown	103	101	93	94
Lake Erie	103	91	79	129
Detroit	135	118	133	141
Chicago	322	318	388	492
Midwest	141	148	164	166
Southern	138	135	160	191
Western	40	39	82	77
U.S. Production	1,284	1,246	1,461	1,623

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢–Mineral Services, 8/13/85. **59.4¢–Inland Steel Mining, 1/1/85 and Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢–U.S.Steel, 8/16/85. 86.9¢–Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective August 25,1986)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,284	1,246	55,429	57,100
Capability Utilization Rate	53.0	51.4	66.8	66.2

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 5/19/86)	24.850	24.850	24.850	27.582
Pig Iron** (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 75.17	$ 75.17	$ 72.17	$ 74.17
No. 2 bundles	$ 53.83	$ 53.83	$ 52.50	$ 53.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 76.50	$ 76.50	$ 72.50	$ 77.50
No. 1 steel, Philadelphia	73.50	73.50	72.50	72.50
No. 1 steel, Chicago	75.50	75.50	71.50	72.50
No. 1 bundles, Detroit	72.50	72.50	67.50	71.50
Low Phos., Youngstown	74.50	74.50	71.50	70.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	93.50
No. 1 mach'y cast., Chi	105.50	105.50	105.50	99.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective August 25,1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	51.27	50.80	8/25/86
Copper (C)	60.00-62.00	60.50-62.00	8/25/86
Lead	22.00-22.25	21.75-22.25	8/25/86
Magnesium Ingot	153.00	148.00	12/ 9/85
Nickel (LME)	170.54	171.43	8/25/86
Zinc	44.00	41.00-44.00	7/30/86

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$248.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$380.00
Indium, dollars per troy oz.	$2.65
Iridium, dollars per troy oz.	$415.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$230.00-240.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.25
Palladium, per troy oz.	$141.00
Platinum, per troy oz.	$578.00
Rhodium, per troy oz.	$1,235.00
Silver ingots, per troy oz.	$5.12
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

August 18—248.63
August 19—246.64
August 20—245.30
August 21—244.69
August 22—245.04

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	58	51
Yellow brass	50	46½
Red brass	53	48
Comm. bronze	54	48¼
Mang. bronze	41½	40½
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	44
Light copper	36

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	40
Light copper	32
No. 1 composition	45
No. 1 comp. turnings	44
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	25
Radiators	35

Aluminum

New mixed clips	35	— 36
Old sheet	33	— 34
Old cast	33	— 34
Clean dry borings	34	— 35

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	28	— 29
Mixed L.C. clips	26	— 27
Old sheets and cast	23	— 24
Borings and turnings	20	— 21
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 47
No. 2 copper wire	36	— 37
Light copper	31	— 33
Radiators	26	— 27
No. 1 composition	36	— 37
No. 1 composition turnings	34	— 35
Cocks and faucets	27	— 28
Clean heavy yellow brass	25	— 26
Brass Pipe	27	— 28
New soft brass clippings	37	— 39

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	105	—115
Nickel rod ends	105	—115
Nickel sheets, clips	105	—115
Nickel turnings	25	— 35

Zinc

New zinc clippings	16	— 17
Old diecast zinc	12	— 13

EFFECTIVE AUGUST 25, 1986

(Effective August 25, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 76.00 to	$ 77.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	93.00 to	94.00
No. 1 factory bundles (auto)	94.00 to	95.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	87.00 to	88.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	44.00 to	45.00
Cast iron borings	43.00 to	44.00
Low phos. punchings plate	104.00 to	105.00
Heavy turnings	66.00 to	67.00
No. 1 RR hvy. melting	84.00 to	85.00
Rails, 2 ft. and under	95.00 to	96.00
Scrap rails, random lgth	82.00 to	83.00
RR specialties	95.00 to	96.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	510.00 to	515.00
18-8 turnings	410.00 to	415.00

Chicago

No. 1 hvy. melting	$ 75.00 to	$ 76.00
No. 2 hvy. melting	71.00 to	72.00
No. 1 dealer bundles	93.00 to	94.00
No. 1 factory bundles (auto)	91.00 to	92.00
No. 2 dealer bundles	60.00 to	61.00
No. 1 busheling	86.00 to	87.00
Shredder scrap	83.00 to	84.00
Machine shop turnings	27.00 to	28.00
Mixed borings and turnings	22.00 to	23.00
Shoveling turnings	29.00 to	30.00
Cast iron borings	41.00 to	42.00
Low phos. forge crop	97.00 to	98.00
Low phos. punchings plate 1/4 in. and heavier	115.00 to	116.00
Low phos. 2 ft. and under	110.00 to	111.00
No. 1 RR hvy. melting	77.00 to	78.00
Scrap rails random lgth	79.00 to	80.00
Reroller rails	104.00 to	105.00
Rails, 2 ft. and under	99.00 to	100.00
RR couplers and knuckles	90.00 to	91.00
RR car axles	106.00 to	107.00
No. 1 machinery cast	105.00 to	106.00
Cupola cast	92.00 to	93.00
Stove plate	99.00 to	100.00
Steel car wheels	91.00 to	92.00
Stainless		
18-8 bundles and solids	475.00 to	485.00
18-8 turnings	380.00 to	390.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 72.00 to	$ 75.00
No. 2 hvy. melting	64.00 to	67.00
No. 1 dealer bundles	86.00 to	89.00
No. 2 dealer bundles	53.00 to	56.00
No. 1 busheling	84.00 to	87.00
Shredder scrap	83.00 to	86.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	79.00 to	82.00
Low phos. 2 ft. punchings	93.00 to	96.00
Electric furnace bundles	90.00 to	93.00
RR specialties	79.00 to	82.00
Rails, 2 ft. and under	96.00 to	99.00
Cupola cast	85.00 to	88.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 57.00 to	$ 58.00
No. 2 hvy. melting	56.00 to	57.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	35.00 to	36.00
No. 1 busheling	70.00 to	71.00
Drop forge flashings	44.00 to	45.00
Machine shop turnings	28.00 to	29.00
Mixed borings and turnings	8.00 to	9.00
Shoveling turnings	28.00 to	29.00
Cast iron borings	22.00 to	23.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	47.00 to	48.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	460.00 to	470.00
18-8 turnings	330.00 to	340.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 57.00 to	$ 58.00
No. 2 hvy. melting	55.00 to	56.00
No. 1 dealer bundles	75.00 to	76.00
No. 2 dealer bundles	33.00 to	34.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Low phos. plate	74.00 to	75.00
Electric furnace bundles	63.00 to	64.00
Galvanized bundles	60.00 to	61.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	80.00 to	81.00
No. 1 factory bundles	76.00 to	77.00
No. 2 bundles	31.00 to	32.00
No. 1 busheling	70.00 to	71.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	20.00 to	21.00
Cut structural & plates, 5 ft. and under	71.00 to	72.00
Cut structural & plates, 2 ft. and under	92.00 to	93.00
Low phos. punchings plate	92.00 to	93.00
Foundry steel, 2 ft. & under	54.00 to	55.00
No. 1 RR hvy. melting	60.00 to	61.00
Rails, 2 ft. and under	89.00 to	90.00
Rails, 18 in. and under	91.00 to	92.00
No. 1 machinery cast	80.00 to	81.00
Mixed cast	47.00 to	48.00
Stainless		
18-8 bundles	460.00 to	470.00
18-8 turnings	335.00 to	345.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 busheling	68.00 to	69.00
No. 1 dealer bundles	68.00 to	69.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	13.00 to	14.00
Mixed boring and turnings	13.00 to	14.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	23.00 to	24.00
Low phos. plate	76.00 to	77.00
Structural and plate, 2 ft. and under	77.00 to	78.00
Rails, 2 ft. and under	75.00 to	76.00
Scrap rails, random lgth	61.00 to	62.00
No. 1 machinery cast	74.00 to	75.00
No. 1 cupola cast	71.00 to	72.00

St. Louis

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	55.00 to	56.00
No. 1 busheling	82.00 to	83.00
No. 1 dealer bundles	83.00 to	84.00
No. 2 bundles	49.00 to	50.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	27.00 to	28.00
No. 1 RR hvy. melting	79.00 to	80.00
Rails, random length	74.00 to	75.00
Rails, 18 in. and under	97.00 to	98.00
RR specialties	79.00 to	80.00
Cupola cast	69.00 to	70.00
Heavy breakable cast	43.00 to	44.00
Stove plate	89.00 to	90.00
Steel car wheels	78.00 to	79.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	54.00 to	55.00

Birmingham

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	70.00 to	71.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	36.00 to	37.00
Electric furnace bundles	67.00 to	68.00
Elec. furnace, 3 ft. & under	70.00 to	71.00
Structural and plate, 2 ft.	89.00 to	90.00
Structural and plate, 4 ft.	83.00 to	84.00
No. 1 RR hvy. melting	83.00 to	84.00
Scrap rails, random lgth	73.00 to	74.00
Rails, 2 ft. and under	90.00 to	91.00
Angles and splice bars	83.00 to	84.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	72.00 to	73.00

Cincinnati

Brokers buying prices per gross ton on cars.

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	77.00 to	78.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	75.00 to	76.00
No. 1 cupola cast	64.00 to	65.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	68.00 to	69.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	33.00 to	34.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	430.00 to	450.00
18-8 turnings	330.00 to	350.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 51.00
No. 2 hvy. melting	39.00 to	41.00
No. 1 dealer bundles	50.00 to	52.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	56.00 to	58.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	72.00 to	77.00
Mixed cupola cast	44.00 to	46.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	20.00 to	21.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 34.00 to	$ 36.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	67.00 to	69.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 74.00
No. 2 hvy. melting, cut 2 ft. and under	66.00
No. 1 dealer bundles	82.00
No. 2 bundles	58.00
Mixed steel scrap	53.00
Bush. new fact. prep'd	77.00
Bush. new fact. unprp'd	60.00
Machine shop turnings	30.00
Short steel turnings	30.00
Mixed borings and turnings	19.00
Cast scrap	97.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 62.00 to	$ 63.00
No. 2 hvy. melting	52.00 to	53.00
No. 2 bundles	33.00 to	34.00
Machine shop turnings	13.00 to	14.00
Crushed turnings	24.00 to	25.00
Shredder scrap	70.00 to	71.00
Cut structural plate, 2 ft. and under	88.00 to	89.00
Cut structural plate, 5 ft. and under	70.00 to	71.00
Unstripped motor blocks	54.00 to	55.00
Cupola cast	81.00 to	82.00

PRICES: HOW LOW WILL THEY GO?

In July, it was more down than up for prices of producers' finished goods. The U.S. Labor Dept.'s producer price index for these goods fell by 0.4 pct from June.

Over the 12-month period ending at the close of July, finished goods prices declined in seven of those months, remained unchanged one month and rose in four months. From the start of the year through July, producers' finished goods prices were down by 2.3 pct.

Prices of capital goods have bucked the tide. Tags on these goods rose in 10 of the 12 months ending at the close of July. And again in July, when producers' prices for all finished goods went *down* by 0.4 pct, prices of capital goods *rose* by 0.2 pct.

The relative strength seen in tags for capital goods raises a question that is baffling some analysts. After all, demand for capital equipment is currently one of the economy's soft spots. Yet, prices for these goods show the greatest relative strength.

Is it continuing price inflation in capital goods that is hurting market demand? That's a question that starts debates rather than yields clear answers.

Much of the recent softness in overall producers' prices has been due to still-falling prices for most lines of energy goods. Over the year ending in July, prices of energy goods have tumbled by more than 36 pct.

Some recent signs of some price firmness in energy goods may well put a floor under prices. Too, widely-anticipated lower interest rates could heat up market demand in the economy and, in turn, create upward price pressures.

A price bottom? It may be now shaping up.

Latest Month Covered: July 1986

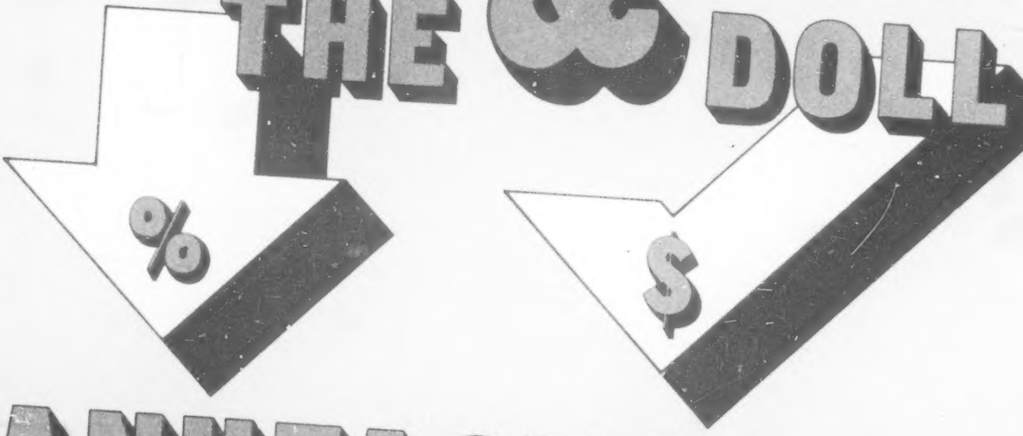
Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	404.0	+ 0.2	+ 1.8
Metal Forming Machine Tools	441.4	+ 0.4	+ 1.6
Agricultural Machinery & Equip.	339.6	– 0.1	+ 0.3
Construction Machinery & Equip.	366.9	0	+ 1.3
Oil and Gas Field Machinery	418.7	+ 0.1	– 1.2
Industrial Material Handling Equip.	297.0	+ 0.4	+ 0.6
Pumps, Compressors & Allied Equip.	361.9	+ 0.2	+ 1.5
Mining Machinery & Equipment	382.4	+ 0.4	+ 0.6
Mechanical Power Transmission Equip.	347.5	+ 1.1	+ 2.2
Automobiles	233.9	+ 0.4	+ 2.2
Motor Trucks—Light	311.2	0	+ 6.0
Motor Trucks—Heavy	347.4	+ 1.3	+ 4.2
Railroad Equipment	367.8	+ 0.9	+ 1.0
Fabricated Metal Structural Products	316.0	+ 0.1	+ 0.4
Electric Motors	353.8	+ 1.2	+ 0.5
Valves & Fittings (Dec. 1982 = 100)	106.9	+ 0.3	+ 1.8
Ball & Roller Bearings	357.0	+ 0.3	+ 1.0
Foundry & Forge Shop Products	363.5	– 0.3	0
Heating Equipment	268.6	– 0.4	+ 3.3
Plumbing Fixtures & Brass Fittings	323.8	– 0.1	+ 3.5
Metal Containers	362.3	+ 0.4	+ 1.2
Internal Combustion Engines	354.2	+ 0.3	+ 2.0

Data based on U.S. Labor Dept.'s Producer Price Index

IRON AGE
MANUFACTURING MANAGEMENT
OCTOBER 3, 1986

10/16/86 C2150-8

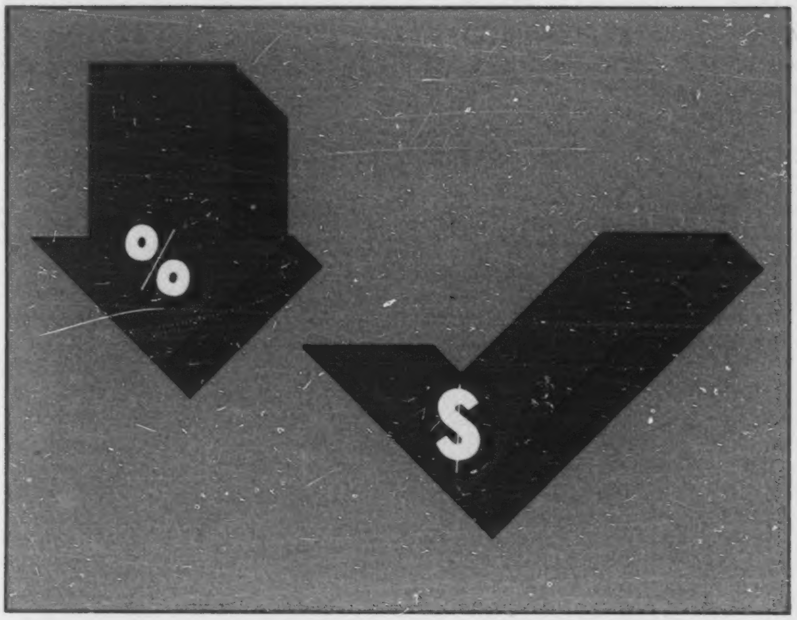
ARE INTEREST RATES & THE DOLLAR MANUFACTURING'S BEST HOPE?



Titanium, Stainless and Superalloys: Battle for the High-Performance Market

OCTOBER 3, 1986 VOL. 229, NO. 19

IRON AGE
MANUFACTURING MANAGEMENT



Editorial 5
Why I still want a flat tax.

Newswatch 11
A GM executive and Cabinet official push computer standards.

Fourth Quarter Forecast 19
Falling interest rates and the dollar are the best hopes.

STEEL 22
NONFERROUS METALS 23
PLASTICS 23
AUTOMOTIVE 24
HEAVY EQUIPMENT 24
MACHINE TOOLS 27
FLUID POWER 27
COATINGS 28
MATERIAL HANDLING 28
COMPUTERS 31
INSTRUMENTS & CONTROLS 31
CASTINGS 33
FORGINGS 33
HEAT TREATMENT 34
WELDING 35

Stanley Vidmar 41
Better tool management can save money.

Stainless Steel 45
Super metals are battling for new applications.

Materials Report 63
Sheet steel prices are expected to rise.

Order Trends 68
Defense business bulges the durable orders picture.

Next Issue: Lasers in Manufacturing.

Departments

EDITORIAL STAFF 6
LETTERS 6
INDUSTRIAL BRIEFS 16
PRODUCT & EQUIPMENT REVIEW 53
FYI 58
MANAGEMENT SERVICE CARD 59
BUSINESS STAFF 61
P&P DATA 9/8 64
FERROUS SCRAP 9/8 65
CLEARING HOUSE 66
AD INDEX 67

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition – $52 one year, $85 Canada/Foreign (24 issues). Metalsproducer edition – $30 one year, $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 2040, Radnor, PA, 19089.

Chilton
abc
ONE OF THE ABC PUBLISHING COMPANIES

FOURTH QUARTER FORECAST

MANUFACTURING'S BRIGHT HOPES: TUMBLING DOLLAR AND INTEREST RATES

BY JOHN D. BAXTER

So far this year, some cherished economic theories have taken a beating. The theories aren't working, and that could mean more bad news for U.S. industry—especially the lagging manufacturing sector—before this year ends.

Case in point: The Federal Reserve Board, since late 1984, has driven interest rates down—and down sharply. Low interest rates are *supposed* to put new life into the economy. But... after almost two years of falling rates, the U.S. economy continues to plow along at a sluggish pace.

Another case in point: The dollar, under pressure from both the Fed and the Treasury Dept., has fallen steadily in exchange value for a year and a half. A falling dollar is *supposed* to boost U.S. exports and shrink imports. But... the U.S. trade balance continues to go deeper into the red.

The dollar and interest rates will have to be pushed even lower if manufacturers are to get any real help before the year is over.

Now, at the start of the final quarter of the year, a look at vital business data makes clear the need for even more intensified policy action to rescue the economy. In other words, there doesn't appear to be any upside business cycle force stirring on its own. This holds true for manufacturing industries which are now the weak link in the economy.

The Big Look

U.S. economic growth has now slowed to a point where it wouldn't take much of a push to topple it into a recession. (A recent survey shows that 31 states are already experiencing recessions.) The latest look shows that U.S. economic growth slowed to a sluggish annual rate of 0.6 pct in the second quarter. That was down sharply from a brief 3.8 pct growth rally in the first period.

The weakening of the economy has been going on for some time. In 1984, growth was 6.4 pct. In 1985, it was down to 2.7 pct. This year, it appears, growth will likely come to a bit more than 2 pct.

Growth has not only been slowing, but lately it has been lopsided as well. Consumers have played the Atlas role and supported the economy on their broad shoulders. In the first two quarters, personal consumption expenditures rose by 3.6 pct and 6.5 pct, respectively. That, while business fixed investment *fell* by 15.1 pct and 2.3 pct.

The low interest rates engineered by the Fed have boosted sales of consumer products, but have not had much direct effect on companies in industrial goods lines. This lack of pass-through of the benefits of big consumer buying to prime industrial producers has been due to imports grabbing off a lion's share of the buying.

King Dollar

Thus, it is a lower dollar, and the policies that bring it about, that remain the shining hope for manufacturers of industrial products. When the dollar goes down far enough, then import competition will be stemmed.

But will help for manufacturing come quickly enough to end the year on the upside?

Based on latest data available as the year's final quarter gets underway, it does not appear that a sharp pickup in manufacturing fortunes will take place in the fourth quarter.

Capital investment, the crux of the matter, appears to be too weak – now, and in terms of near-at-hand prospects.

Business investment, even in these days of fine tuning of the economy by government policies, is still based largely on two questions that corporate senior executives must ask: 'Do I need new equipment? Can I afford it?'

A look at just a few investment-critical facts of life now facing manufacturing managers gives an idea of just what the answers of many are likely to be – at least, in this quarter.

In July of this year, the Fed's index of production (1977 = 100), for durable goods manufacturers was 126.3. That measure was one decimal point below the index of 126.4 of July of *two years ago*. In short, factory output of durable goods producers has been on a virtual plateau for two years.

Another key measure that underlies investment decisions by companies is seen in just how hard they are pressing their production capacity. On the basis of the recent trend in the Fed's aggregate measure of capacity utilization in manufacturing, there also has been no need to pile in new equipment. In July of this year, U.S. manufacturers were running their plants at 78.5 pct of capacity. That was the lowest usage rate since a 77.9 pct rate in November 1983.

Still, how about new orders flowing to manufacturers? The orders trend is important because it points to *future* changes in levels of output or plant usage. After all, managers must plan ahead in considering capital investments.

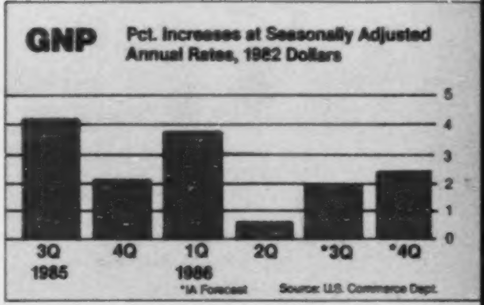
The best measure of new orders, as related to investment needs, is seen in orders for durable goods.

In July, these orders rose strongly from June due largely to a spurt in those always-volatile defense industry orders. Still, even including the defense orders, July orders were still 1.1 pct below the inflow back in January. Too, July orders, at $107.1 billion, were some $600 million below the orders volume received back in August of last year.

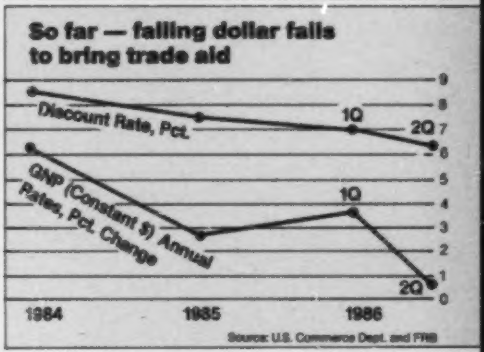
In sum then, the recent trend in factory output, plant capacity usage and incoming new orders points to no pressing need for manufacturers to invest in new plant and equipment.

Top-Heavy With Debt

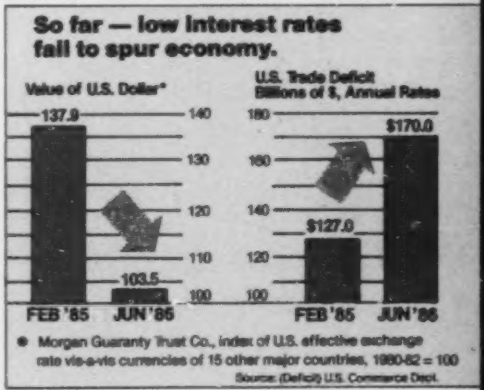
Further, even if companies had need for new equipment, they might be hard-pressed to pay for it. Balance sheets of a great many manufacturers these days are top-heavy with debt. Moreover, corporate profits from operations in the second quarter this year were 1.7 pct *below* the third period last year, on a seasonally adjusted annual rate basis. And cash flow from operations – often called the prime feeder of plant spending – was up only an anemic 0.6 pct.


GNP Pct. Increases at Seasonally Adjusted Annual Rates, 1982 Dollars

*IA Forecast
Source: U.S. Commerce Dept.


So far — falling dollar fails to bring trade aid

Source: U.S. Commerce Dept. and FRB


So far — low interest rates fail to spur economy.

* Morgan Guaranty Trust Co., index of U.S. effective exchange rate vis-a-vis currencies of 15 other major countries, 1980-82 = 100
Source: (Deficit) U.S. Commerce Dept.

It would be expecting too much to think that all these signs would turn around in the final period of the year. Economic policy couldn't break things loose that suddenly. And the basic forces of the business cycle aren't likely to reverse themselves and make plants busy again overnight.

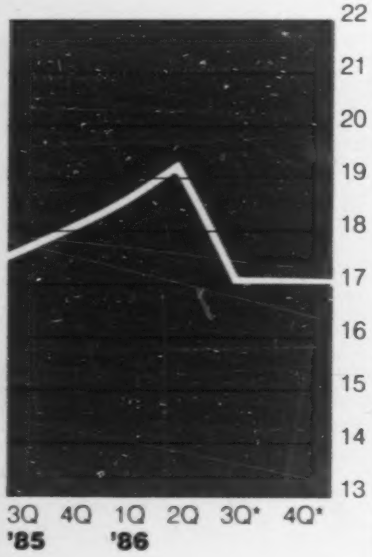
There still could be pleasant surprises. After all, many economic forecasts have missed the mark lately, even in the close-at-hand projections.

But, at this time, it does appear that manufacturers waiting for good news will probably have to wait until next year. ☐

STEEL

If there are other work stoppages, steel supply could really tighten.

Steel Shipments
In Millions of Tons



Source: AISI
*IA estimate

Going into the fourth quarter of 1986, the steel market picture was distorted by labor influences.

The strike at steel plants of USX Corp. diverted business to other mills. There could be more shifting of orders because of labor difficulties at other plants. As of early September, two plants of Armco, Inc., had yet to negotiate new contracts.

Benefiting from the labor situation were mills assured of continued operation. Weirton Steel Corp. and LTV Steel had both activated blast furnaces. Other large producers reported improved demand, particularly for sheet products.

It didn't appear that the improvement could be traced to anything other than the labor situation. Mill officials said the consumption of steel was down from the first half of the year.

While the market spurt seemed artificial and temporary, it could have one very real effect. Steel price increases for sheet and structurals were receiving widespread support. The increases proposed for plates were given a chance of sticking.

It's possible the steel industry will get its first significant price relief in five years. Relief is badly needed. Since the start of 1982, the industry has lost more than $7 billion. Wheeling-Pittsburgh Steel Corp. went broke in 1985, and LTV Corp. went bankrupt a few months ago.

The companies have attempted to restore profits by reducing costs. The industry's work force has been slashed more than 50 pct. The new contracts negotiated with United Steelworkers of America have cut labor costs—by $3.60 an hour in the case of LTV.

However, steel transaction prices have come down by 12 to 14 pct in the last five years.

It's doubtful that there will be an immediate, clear-cut price rise. Many of the orders in hand are at firm prices through the third quarter and in some cases through longer periods.

Nevertheless, there is a determined effort to implement increases as soon as possible. The success of this effort will depend to a considerable extent on the length of the USX work stoppage.

The answer to this could be: forever. More than a month after the Aug. 1 shutdown, the two sides weren't even talking and had no plans to talk. Pressure on the Steelworkers for a settlement was reduced when a number of states went along with the union's contention that the stoppage was a lockout, not a strike. On this basis, USX workers were declared eligible for unemployment compensation in Pennsylvania, Minnesota, Texas and Alabama. Payments in Pennsylvania range from $190 to nearly $230 a week.

On the other side, USX cushioned early impact of the strike by building stocks of finished steel in outside depots. There were said to be full month's supplies for some large accounts. There could also be delayed billing for material actually in the hands of users.

Also, USX can rely on revenues from its Marathon Oil division. The oil glut has hurt the division, but Marathon had second quarter sales of $2 billion and an operating profit of $179 million.

All in all, the outlook seemed to be for a long shutdown—possibly for the rest of 1986. Subtracting 1 million tons a month from normal supply should make for price firmness. If there are other work stoppages, supply could really tighten.

NONFERROUS METALS; PLASTICS

NONFERROUS METALS—It goes without saying that the fourth quarter will be better than the third for the nonferrous metals companies, if only for the absence of seasonal factors. About the best that could be said for the third quarter was that things didn't get any worse.

Metal prices still were on the defensive as they crossed the Labor Day boundary line. Copper values on the Comex were close to life-of-contract lows and they weren't projecting much more than a 6 pct rise through 1987.

Aluminum prices on the London Metal Exchange were edging up from seasonal lows (set earlier in August), but the LME nickel price was still bumping along the bottom.

Consumer markets continue to be the mainstay for the base metals. Capital spending rates thus far in 1986 haven't been sustaining and the new tax bill isn't expected to provide much of a spur for some time to come.

The aluminum industry booked 9.67 billion lbs of new business in the first half of 1986. First half shipments, according to the Aluminum Association, amounted to about 8.0 billion lbs, up 3.2 pct from the same 1985 period. Incoming business has been at a low level since last March and the industry has been living off that first quarter bulge.

Smelter strikes notwithstanding, the industry's inventory edged up in June, largely because of accumulations of ingot and scrap.

The drop in the value of the dollar didn't put much of a dent in aluminum mill product imports. Ingot imports, on the other hand, jumped nearly 75 pct. The lower dollar didn't do much for exports.

PLASTICS—Just what will happen next and when in the price of hydrocarbon feedstock is still on the minds of plastics producers and large customers. This situation is liable to continue, at least through the end of the year.

No matter, the plastics industry is well on the way to the best year in its history.

The big gainer this year is the thermoplastic polyester resins, materials which are becoming the structural darlings of the automotive industry.

Also showing strength is the nylon resins. Both materials, incidentally, are engineering plastics and are feared most by metals producers.

Through June, in sales and captive use, plastics as a whole are running 4.9 pct ahead of a record-breaking 1985. Thermoplastic polyesters are a healthy 17.5 pct ahead, while nylon resins are 10.5 pct ahead of 1985. The thermosets, which include the epoxies, are up by 5.1 pct, while the thermoplastics are enjoying a 4.8 pct gain.

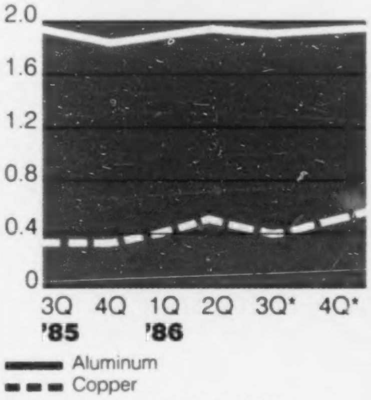
This year's third quarter is up about 1.8 pct over a good second quarter. The industry as a whole is expecting to see a seasonal slump of about 3.5 pct in the fourth quarter. Nevertheless, business is running close to 2 pct better than 1985 throughout all quarters.

On the customer side, the electronics industry remains strong. In automotive, gains are easier to come by, since plastics are starting almost from scratch as structural materials.

Another welcome sign for the industry—both for thermosets and thermoplastics—is the apparent revival in the home construction market.

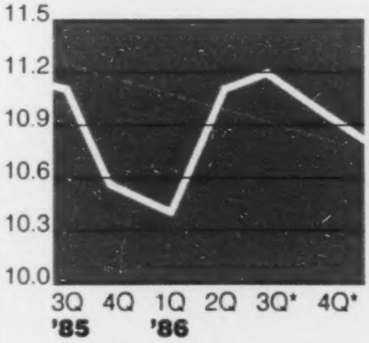
The fourth quarter will be better than the third for the nonferrous metals.

Nonferrous Metals Shipments
In Millions of Short Tons



Source: American Bureau of Metal Statistics, Aluminum Assn.
*IA estimate

Plastic Resins Sales & Captive Use
In Billions of Lbs

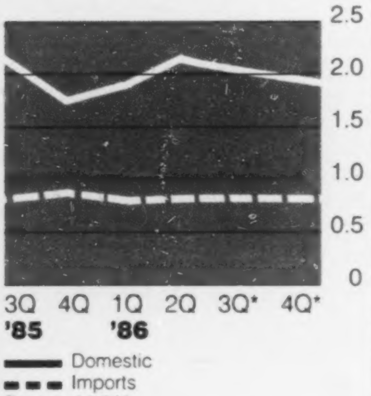


Source: SPI Committee on Resin Statistics as complied by Ernest & Whinney *IA estimate

AUTOMOTIVE; HEAVY EQUIPMENT

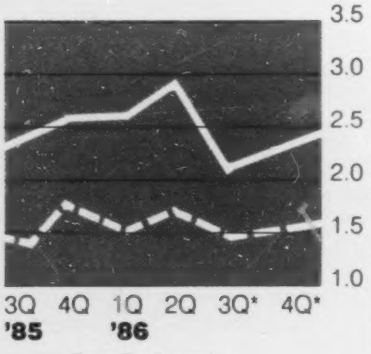
U.S. automakers plan to produce 2.0 million units in the fourth quarter.

Automotive Sales
In Millions of Units



Source: MVMA
*IA estimate

Heavy Equipment Shipments
In Billions of Dollars



Source: U.S. Dept. of Commerce
*IA estimate

AUTOMOTIVE – U.S. automakers expect to sell 1.9 million cars in the fourth quarter. That's a slight drop from the estimated 2.0 million sales in this year's third quarter but an increase from the 1.7 million units sold in the fourth quarter of 1985.

Foreign automakers predict sales of 800,000 cars in the fourth quarter. That's how many they sold in the same period last year.

In late August General Motors began offering 2.9-pct financing on three-year loans, a deal it termed "the greatest purchasing incentive in our company's history." Ford and Chrysler quickly followed suit. American Motors even offered zero-pct financing on two-year loans.

The effect of the incentives was "electrifying," said one GM sales vice president. "There were overflow crowds in GM showrooms and a record level of credit applications received from dealers by GM Acceptance Corp."

The incentives helped GM reduce its dealer stocks from 80 to 63 days' worth during August. Ford's dropped to 56 days and Chrysler's to 60 days; a stock of 60-65 days is considered optimum.

The incentives have cleared dealers' lots of most 1986 models. The big question now: Will the automakers have to use more incentives to sell their 1987 models?

U.S. automakers built 1.7 million cars in the third quarter. They plan to produce 2.0 million units in the fourth quarter to replenish the stocks depleted by the incentives.

The price discounts and low interest rates have raised consumer buying attitudes to the highest level in 40 years, reports the University of Michigan's Institute for Social Research.

HEAVY EQUIPMENT – Manufacturers of heavy equipment expect shipments to fall in the fourth quarter from last year's levels.

Farm equipment makers predict $2.4 billion of shipments in the fourth quarter compared with $2.6 billion in the same period last year. Construction equipment makers expect shipments to drop from $1.7 billion to $1.6 billion in the same period.

Midway through 1986, equipment customers became certain that the U.S. Congress will end the 10 pct tax credit for buying heavy equipment. Congress will allow no such credits for purchases made after Dec. 31, 1985. Sales of heavy equipment slowed as customers realized the tax credit was gone.

Also, farm equipment makers in 1984 and 1985 offered higher discounts in the first half than in the second half. Discounts probably will drop off again in the second half of this year.

"I expect sales of farm equipment to drop by 5-10 pct from the second half of 1985 to the second half of 1986," said the economist of one leading farm and construction equipment firm.

Construction equipment inventories are about where they should be, said one executive. Federal spending for roads is decreasing, but state and local revenues are taking up the slack. That will mean continued orders for wheelers and crawlers and some excavators.

"Farm equipment inventories are twice as high as construction equipment ones," said the heavy equipment executive. Farm equipment inventories are swollen to 3-6 months above optimum supplies, he said.

MACHINE TOOLS; FLUID POWER

MACHINE TOOLS—The U.S. machine tool industry continues to be mired, the result of management indecision, low plant utilization rates, and pending new tax laws that appear to be full of disincentives for capital spending.

In the absence of any positive news for the manufacturing business that would give even a glimmer of hope for a significant order upturn, *Iron Age* predicts the fourth quarter for U.S.-based machine tool builders will be about the same as the second quarter, with the third quarter dipping about 7 pct.

The outlook for the machine tool industry as a whole may be a great deal stronger than the figures indicate. If the U.S. machine tool market is or has collapsed, why is it still considered to be the number one machine tool market in the world? Many overseas machine tool builder want a piece of the action and are doing everything possible to get market share. Several have already set up assembly and manufacturing plants within the U.S.

Import restrictions on machine tools, if imposed by the U.S. government, would not necessarily change the number of machine tool orders placed, though U.S. builders might benefit somewhat in the long term.

The lower value of the dollar theoretically gives U.S. builders an edge on exporting, but most neither have the desire nor the resources to mount effective campaigns overseas. Those builders that have been exporting and are established overseas should do well.

Meanwhile, the backlog of orders among U.S. builders is shrinking as shipments outstrip orders.

FLUID POWER—Shipments of fluid power products during the first half of 1986 have been blowing hot and cold month after month.

Shipments of hydraulic and pneumatic fluid power products rose 19 pct in January over December. In February, they dropped 2 pct below January, only to rise in March to 5 pct over February.

The percentage increases and decreases masked the steady but slightly upward improvement in shipments during the first half of the year. Shipments in the first quarter rose 3 pct over the fourth quarter of 1985 and the second quarter of 1986 was up 4 pct over the previous quarter.

The outlook for the rest of the year is cautious and depends largely on the general economy as it impacts on aircraft, machine tools, farm equipment, and off-highway construction equipment.

The fluid power industry appears to be in a flat calm about to be buffeted by a rising tide of direct and indirect imports.

A highly cyclical seasonal business, the fluid power industry has managed to turn in some pretty solid sales, adjusted for inflation, in a flat year.

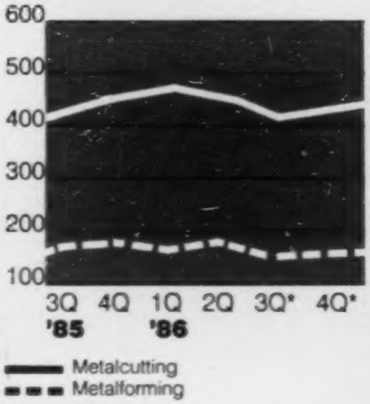
It has done well considering that the U.S. machine tool builders, in general, are doing poorly. The farm equipment builders are working off excessive inventories, so their production is low, and the off-highway construction industry is going nowhere.

The aircraft industry is doing well in some areas, poorly in others.

For the fourth quarter, *Iron Age* predicts more of the same. It will be a good year, in retrospect, but lackluster on a day-by-day basis.

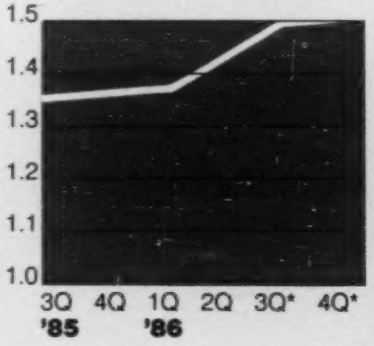
The outlook for the machine tool industry may be stronger than the figures indicate.

Machine Tools Net New Orders
In Millions of Dollars



Source: NMTBA
*IA estimate

Fluid Power, Shipments
In Billions of Dollars

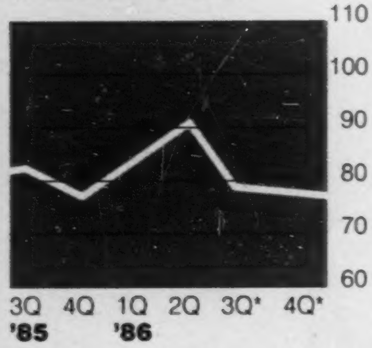


Source: U.S. Dept. of Commerce and NFPA
*IA estimate

COATINGS; MATERIAL HANDLING

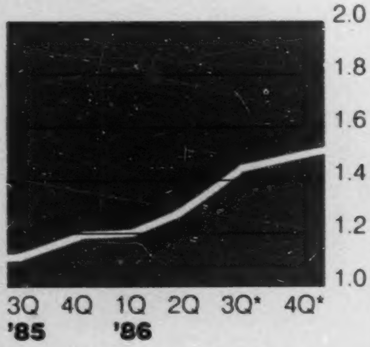
Most of the coaters' major markets are ordering fewer gallons this year.

Industrial Coatings Shipments
In Millions of Gallons



Source: U.S. Dept. of Commerce
*IA estimate

Material Handling Shipments
In Billions of Dollars



Source: Material Handling Institute
*IA estimate

COATINGS—Industrial-coating companies expect to ship about 77 million gallons of product in the fourth quarter this year. That's the same number they shipped in the fourth quarter last year.

"The pickup in business we had hoped for in the second half of 1986 never materialized," explained the vice president of a major Midwestern coatings firm. "Shipments in the fourth quarter of 1985 were so low, however, that I hope we can at least match them."

Most of the coaters' major markets are ordering fewer gallons this year. The business-machine market has accounted for perhaps the biggest drop in coating shipments: down 35 pct from 1985.

"Business-machine sales reached their peak in 1984," commented one executive. "I don't think we'll see those levels of sales again for a while."

Coil coatings are holding steady despite a big dropoff in demand for automotive Zincrometal. Coil coaters are focusing now on other markets: automotive functional parts and metal office furniture such as desks and filing cabinets. Growth in the latter market has been greatly aided by new durable adhesives that eliminate the need for welding.

One healthy market for all coatings is the metal extrusions used for doors, windows, and other parts of buildings. "The metal-extrusion market for coatings just keeps on rolling," commented one executive.

The trend to high-solid coatings continues. High-solid coatings have 80 pct solids by weight, compared with 50-60 pct for conventional coatings. "Almost everyone's choosing high-solid coatings now," said one coatings manager.

MATERIAL HANDLING—Fourth quarter forecasts can be drab, even predictions of a fall order pickup can be overhung with the summer slump.

But the materials handling industry is keeping its head—and hopes—up for the fourth quarter and into 1987.

One Midwestern AS/R systems manufacturer said the auto industry has been "greasing his wheels," through the three quarters of 1986 and he sees no downshifting of gears into 1987.

Several other AS/R systems manufacturers reported backlog strength, and are confident their traditionally strong markets—electronics, defense, food and beverage—will hold up into the new year. (And, as they continue to point out, their optimism is fed by their "broad market base.")

In figure estimates, makers of sophisticated, automated systems see fourth quarter bookings up 10 to 12 pct over the third quarter; shipments, perhaps 15 to 17 pct higher in fourth quarter 1986 vs. the third quarter.

Although most lift truck makers continue to show black-and-blue marks from imports and have gone about as far as they can in discounting prices, two Midwestern companies that make industrial lift trucks reported strong sales of their customized walkie lift vehicles this summer, with the trend continuing throughout the winter.

Reacting to the tax overhaul package, one MH executive complained, "It's sharpening the wrong side of the blade."

New business taxes will contract corporate capital expenditures, "eventually undercutting productivity, which the U.S. should avoid," he added.

COMPUTERS; INSTRUMENTS & CONTROLS

COMPUTERS—For some 20 months now, the computer industry has been in a slump. Occasionally, brief sales flurries have lead to forecasts of the slowdown's end. But the slump is still with us.

If computer equipment orders continue at the same rate as they have through the first two quarters, 1986 sales figures will top 1985 totals by little more than 2 pct (a long drop from the 25 pct growth of 1984). However, this figure could be low if a recent sales flurry continues.

Led by the solid performance of Digital Equipment Corp. (17 pct second quarter growth), a number of selected computer firms, countering the trend, have been doing well in recent months.

The current slump in computer sales results from a variety of factors. In the past, sales were unaffected by changes in capital spending. No longer. Today, sluggish industrial production is holding down capital spending and therefore computer purchases.

Also, companies are discovering computers are not a panacea. Many companies that have turned to computerization are finding that hoped for major productivity increases are not materializing. They have become gun-shy.

Also, firms that already have computers are hesitant to take next step—linking those computers together into networks and integrated systems. Many firms with a hodgepodge of computer equipment are pausing to re-evaluate their operations with an eye to making better use of the computers they already have rather than buying new ones.

For the most part, the most successful computer companies in recent months have been those best able to address integration issues.

INSTRUMENTS & CONTROLS—The dollar is declining in value relative to other major currencies. This is good new news for U.S. instruments and controls manufacturers, for more than one-quarter of their production goes to foreign countries.

The bad news is that sluggish U.S. industrial production and capital spending are making sales harder to come by in this country. And with overseas instruments and controls manufacturers becoming increasingly competitive both here and abroad, industry growth for the third and fourth quarter is approaching a standstill. A 1 pct sales increase for each quarter is expected. This sluggishness could spill into the first half of 1987.

Sales at home have slipped because of a fall-off in manufacturing capacity utilization, bringing on a decline in industrial construction. New construction tends to generate instrument sales.

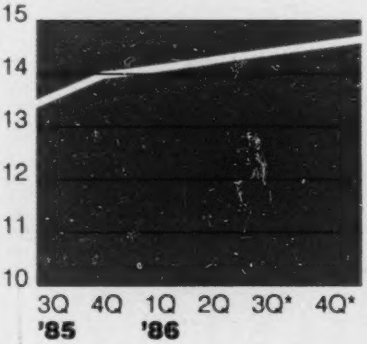
In addition, traditional heavy users of measuring and controlling instruments (one of three major instrument classifications—the others being scientific instruments and instruments to measure electricity) have fallen on hard times. The depressed steel and oil and gas industries, for example, are buying few instruments.

On the plus side, R&D programs, especially those run by defense-related industries, remain strong. Research operations are heavy users of instruments.

The rising emphasis on quality is bringing about increased use of mechanical testing equipment, while increased production of aircraft, especially for the commercial sector, means more instrument sales.

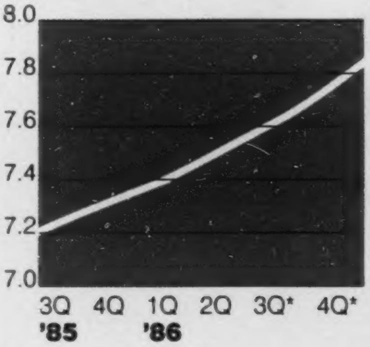
Sluggish industrial production is holding down computer purchases.

Computers Shipments
In Billions of Dollars



Source: U.S. Dept. of Commerce
*IA estimate

Instruments & Controls Shipments
In Billions of Dollars



Source: U.S. Dept. of Commerce
*IA estimate

CASTINGS; FORGINGS

CASTINGS—At best, business conditions in ferrous castings can best be described as moving sideways. Some foundries are reporting increased sales; others, just the reverse. Much of this can be traced back to Detroit where some car models are selling, others not.

Iron foundries continue to go out of business—all due, industry members say, to government policies on foreign sourcing and imports. These problems are having a crippling effect on the U.S. industry. Foundrymen are not optimistic that any policy changes are in the offing in Washington.

The U.S. Dept. of Commerce sees a 27 pct drop in ferrous casting shipments from the second quarter of 1985 to the same period this year. *Iron Age* foresees a 15 pct decrease in the third quarter from the same period of 1985, but only a 5 pct drop in shipments from the second to third quarters of 1986.

Some foundries are not so gloomy as these figures would seem to indicate, especially at the beginning of this year. The present government statistics show that this year's January-to-May period is 25 pct under the same period in 1985. It would appear that business has not really been that bad.

As a result, Commerce officials are working on a more reliable set of figures. Revisions are imminent.

During the second quarter, shipments seem to have hit high levels in April. This was true for gray, ductile and malleable iron castings. The same was the case for steel castings. Over the longer haul, foundrymen see ductile iron as the growth material. Gray iron castings, they add, will continue to shrink in volume.

FORGINGS—As predicted, the forging industry is closing out what could charitably be called a flat year. Last year, industry forecasters said 1986 sales figures would be no better than 1985 totals. That appears to be what is happening. Going into September, year-to-date 1985 and 1986 order totals were dead even.

And 1987 likely will be no better—and could be a good deal worse. If capital spending continues its nosedive, if auto sales continue to tail off, if military spending is cut, and if forgings continue to pour into this country at their current record pace, then U.S. forging companies are in for a tough 1987.

And there is more bad news. The continuing depression of industries that once were heavy forging users—notably the oil patch, agricultural and off-highway equipment, and industrial machinery industries—is expected to carry into 1987.

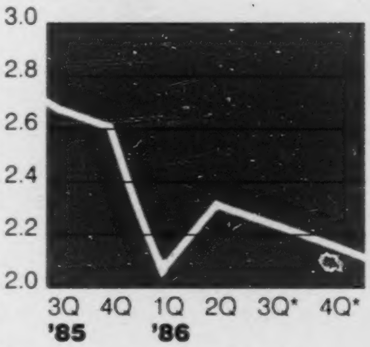
The one bright spot is that commercial aircraft production should remain strong through next year. Since an estimated 40 pct of the domestic forging production goes to aerospace companies, a strong commercial aerospace sector can shore up a major portion of a faltering industry.

Another plus is the declining strength of the dollar. With more than 40 pct of ferrous forged products coming from overseas, a weakened dollar makes it more costly to import. However, offshore forging producers are fighting to maintain their share of the U.S. market.

The fourth quarter should see more orders and shipments than the third, if only because production and orders traditionally rebound after summer slowdowns.

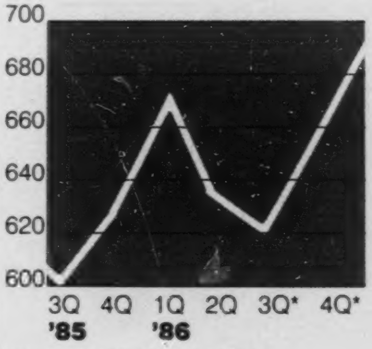
Over the longer haul, foundrymen see ductile iron as the growth material.

Ferrous Castings Shipments
In Millions of Tons



Source: U.S. Dept. of Commerce
*IA estimate

Impression Die Forgings Shipments
In Millions of Dollars

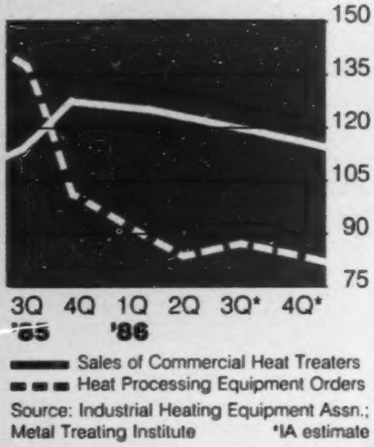


Source: Forging Industry Assn.
*IA estimate

HEAT TREATMENT

No improvements are seen by the heat treating industry.

Heat Treatment
In Millions of Dollars



Source: Industrial Heating Equipment Assn.; Metal Treating Institute *IA estimate

HEAT TREATMENT – The activity in heat treating, both from the standpoint of commercial heat treating and heat processing equipment orders, is not good.

In addition, industry members foresee little improvement in the near term unless favorable tax reform is enacted. Customers continue to shy away from inventory build-ups, one source says.

Out-sourcing continues to be a major problem, especially in the Midwest. Some manufacturers are going overseas for heat-treated components.

Also, some commercial heat treaters are reporting cases where customers are switching from metals to plastics, especially in smaller parts.

Business in the oil country industry gets worse and worse, with no let-up in sight.

Domestic orders for industrial heating equipment are not very encouraging, according to the Industrial Heating Equipment Association (IHEA). Orders for equipment reached $73 million in the second quarter, a decrease of 13 pct from orders reported for the same period in 1985.

Domestic industrial furnace and oven sales for the second quarter of 1986 totaled $31 million, down 41 pct from 1985 when orders totaled $51 million.

On the commercial heat treating side, the Metal Treating Institute reports a $1^3/_4$ pct drop in dollar sales in the second quarter from the same period in 1985.

Iron Age estimates a 4.3 pct increase in sales for this year's third quarter vs the third quarter, 1985, but a 2 pct drop in sales from the second to third quarter of this year.

No improvements are seen by either sector for the fourth quarter.

Coil Joining Update for High-Strength Steel:

TAYLOR-WINFIELD'S COMBINATION FLASH-BUTT WELDER IS FULLY AUTOMATIC, ON-LINE AND WELDING HIGH-STRENGTH STEEL AT DOFASCO, INC.

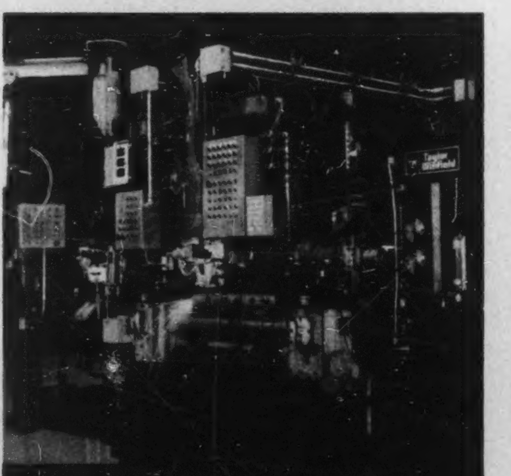
Its patented oxygen-depletion welding technique, low-voltage flashing and high-current density provide the ideal condition for welding HSLA steel.

...And its full automation serves the demand, now, for increased productivity *with* quality.

For your full update, contact

TW Taylor Winfield

The Taylor-Winfield Corporation
1052 Mahoning Ave., Warren, OH 44482 (216) 399-8861
Telex 098-2433 Fax: (216) 392-6336



Fully automatic installation at Dofasco — with trimmer, weld identification, dual-head notcher and transfer clamp, all controlled by T-W Accucon System 101 and DEC 11 series minicomputer.

©1986 The Taylor-Winfield Corp.

WELDING

WELDING – Statistics from the National Welding Supply Association (NWSA) indicate that the second quarter of 1986 was the "best ever."

Most major manufacturers of welding equipment and electrodes, however, disagree.

A spokesman for one major welding manufacturer said that the second quarter for his company fell below expectations, but that there was a slight rebound in the third quarter.

Clouding predictions is present labor unrest among several major users of welding. The effect is a reluctance on other companies to take advantage of the low interest rates and go ahead and expand.

The auto industry continues to slip, but defense work, especially in Naval shipbuilding, remains very strong.

Also strong are the many new but small fabricators and manufacturers that are finding niches in weld fabrication.

The figures from the NWSA indicate a slight 1.2 pct increase in welding distributor sales from the second quarter of 1985 to the second quarter of 1986.

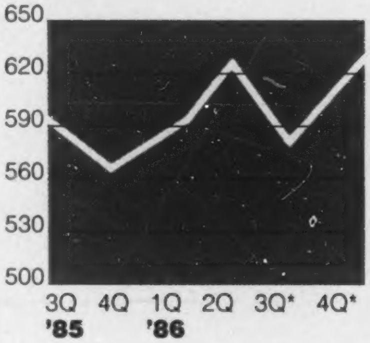
An even slighter 0.2 pct decrease is *Iron Age's* estimate of sales from the third quarter of 1985 to the same period this year, and a 5 pct increase in distributor sales from this year's second to third quarter.

The NWSA index is compiled from monthly sales of a statistically selected cross section of the association's membership. Incidentally, the figure of 216.9, recorded in April of this year, was the highest ever since the NWSA started keeping track of sales in 1977.

On the other hand, domestic welding manufacturers see current business as "flat."

Domestic welding manufacturers see current business as 'flat.'

Welding Shipments



Index 100 = $200 million in distributor sales
Source: National Welding Supply Assn.
*IA estimate

ALCOA TECHNOLOGY CONTRACT SERVICES

Let Alcoa show you how to weld aluminum.

Order this free booklet which explains our welding consultation and training services which can be conducted at your work site.

Welding aluminum is not difficult, just different. Alcoa's welding specialists can assist you in finding the solution to your aluminum welding problems as they have for others—and they can do it at your facility with your welders and your equipment.

Areas covered are ▪ type welding process ▪ joint design ▪ filler alloy/base alloy compatibility ▪ precleaning procedure ▪ welder's technique ▪ welding parameters and procedures.

Put Alcoa's technical experience to work to train your welders, improve methods, recommend equipment needs and modifications.

Although this service is on a fee basis, it could be one of the best investments you ever made.

ALCOA

Alcoa Welding Consultation Services

For more information, send coupon today.

Aluminum Company of America
Technology Marketing Division
455-K Alcoa Building
Pittsburgh, Pennsylvania 15219

Please send your booklet on welding services to:

Name
Title
Company
Address
City
State Zip
Phone

Steel summary: Sheet prices expected to rise this month

Price increases for steel sheet seem to be sticking.

Mill executives said they were applying the increases to fourth quarter orders not covered by long term contracts. According to one estimate, about half the sheet tonnage will be carrying higher prices after Oct. 1.

Making for price firmness is a tightening of supply as a result of labor problems and other factors. The work stoppage at steel plants of USX Corp. provided extra business for other mills.

In addition, there was uncertainty about continued supply from a number of steel mills. The Rouge Steel division of Ford Motor Co. was operating on labor contract extensions in September. Armco, Inc.'s Middletown, Ohio, plant, was hit with a brief walkout in early-September, but the workers were expected to return pending ratification of a tentative agreement. The bankruptcy of LTV Corp. could result in labor hassles.

The effect of all this has been to extend lead times to about eight weeks on hot rolled sheet and 10 weeks on cold rolled sheet. The supply of galvanized sheet was fairly tight to start with and problems were reportedly being compounded by slow start-ups of the five new electrogalvanizing lines.

Another element in the supply picture was the voluntary restraint program for steel imports. The import tonnage rose in July (see following story), but officials said Japanese and European mills were abiding by their limits.

Steel users in the Midwest were said to be having difficulty buying all the foreign steel they wanted.

With regard to demand, a sharp increase in auto sales in August indicated orders for sheet would continue at brisk levels. Domestic car sales jumped from an annual rate of 7.4 million in July to a rate of 9.4 million in August.

The auto companies and other large users buy steel on contracts that provide firm prices for 6 to 12 months. It will be some time before higher prices can be applied to this business.

Service centers, welded pipe mills, and miscellaneous end users buy on a quarterly basis and can be hit with higher prices in the fourth quarter.

The leverage of pricing can be enormous. Since the start of 1982, steel prices have been cut 12 to 14 pct. This has been the big factor in the industry's $7.5-billion-loss over the last four years.

Mill officials don't expect a dramatic profit swing now, but they are hoping for a little relief.

Steel imports topped 2 million tons in July, AISI says

Steel imports have climbed sharply as U.S. raw steel production continues to slip, according to the American Iron and Steel Institute (AISI).

The trade group's latest figures, for July, showed steel imports climbing to the highest monthly level this year—to 2.06 million net tons. That, AISI said, compared with 1.73 million tons in June and 1.58 million tons in July 1985.

AISI blamed the July increase on increased shipments from countries not covered by the voluntary restraint agreements (VRAs) put into place by President Reagan.

AISI reported that imports from Canada rose from 249,000 tons in June to 307,000 tons in July, pushing the seven-month total from that country to 1.82 million tons, compared with 1.77 million tons in the same 1985 period.

It also noted that imports from Taiwan rose from 49,000 tons in June to 65,000 tons in July, making a seven-month total of 295,000 tons this year, compared with 116,000 tons in the same 1985 period.

July imports were 27.1 pct of the estimated supply in the U.S. market, based on AISI's preliminary estimate of domestic mill shipments of 5.6 million tons for the month. This compared with 22.6 pct in June and 21.9 pct in July 1985.

The trade association also noted that imports totaled 12.78 million tons in the first seven months of this year, or 23.2 pct (as a preliminary estimate) of the market supply. That compared, it said, with 14.54 million tons—or 25.6 pct—in the first seven months of 1985.

Imports of semi-finished steel were 1.27 million tons in the first seven months of this year, compared to the Reagan Administration's goal of holding them to 1.7 million tons for the entire year.

Scrap price corrections

Several prices which were reported effective August 25 and appeared in the September 19 issue of *Iron Age* were incorrect. The prices that should have been reported are as follows:

Pittsburgh:	
Shoveling turnings	$43-44
Cast iron borings	$42-43
Chicago	
No. 1 dealer bundles	$89-90
No. 1 busheling	$85-86
No. 1 RR hvy. melting	$79-30
Buffalo	
No. 1 hvy. melting	$53-54
No. 2 hvy. melting	$43-44
No. 1 busheling	$71-72
No. 1 dealer bundles	$71-72
No. 2 dealer bundles	$31-32
Cast iron borings	$25-26
Low phos. plate	$78-79
Structural and plate, 2 ft. and under	$78-79
Ingot Makers Scrap	
Radiators	34¢
Dealers' Scrap	
Aluminum	
Borings and turnings	19-20¢

Scrap price clarification

At **St. Louis**, effective Sept. 8, *Iron Age* stopped reporting prices for rails, 18 in. and under. Instead, it will report prices for rails, 5 ft. and under, in that market.

PRICE & PRODUCTION DATA

(Effective September 8, 1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	116	134	130	182
Pittsburgh	158	168	176	149
Youngstown	112	103	97	91
Lake Erie	100	103	84	113
Detroit	143	135	122	147
Chicago	315	322	298	491
Midwest	139	141	134	162
Southern	136	138	135	182
Western	42	40	61	74
U.S. Production	1,261	1,284	1,237	1,591

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton $32.53
Mesabi, non-bessemer	gross-ton $30.03-31.53

*58.0¢–Mineral Services, 8/13/85. **59.4¢–Inland Steel Mining, 1/1/85 and Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢–U.S.Steel, 8/16/85. 86.9¢–Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective September 8, 1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,261	1,298	57,988	60,295
Capability Utilization Rate	52.0	53.5	66.1	66.0

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 8/31/86)	24.951	24.850	24.850	27.582
Pig Iron** (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	$ 74.50	$ 75.17	$ 74.83	$ 72.83
No. 2 bundles	$ 52.17	$ 53.17	$ 53.83	$ 53.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 76.50	$ 76.50	$ 75.50	$ 75.50
No. 1 steel, Philadelphia	73.50	73.50	73.50	70.50
No. 1 steel, Chicago	73.50	75.50	75.50	72.50
No. 1 bundles, Detroit	72.50	72.50	69.50	69.50
Low Phos., Youngstown	74.50	74.50	74.50	70.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	92.50
No. 1 mach'y cast., Chi	103.50	105.50	105.50	99.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective September 8, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	52.07	51.27	9/ 8/86
Copper (C)	64.00-65.00	60.00-62.00	9/ 5/86
Lead	22.50-23.00	22.25-22.50	8/28/86
Magnesium Ingot	153.00	148.00	12/ 9/85
Nickel (LME)	166.84	170.54	9/ 8/86
Zinc	44.00	41.00-44.00	7/30/86

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$248.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold per troy oz.	$413.25
Indium, dollars per troy oz.	$2.65
Iridium, dollars per troy oz.	$415.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$195.00-210.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.25
Palladium, per troy oz.	$141.00
Platinum, per troy oz.	$610.00
Rhodium, per troy oz.	$1,235.00
Silver ingots, per troy oz.	$5.78
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

September 1—N.A.
September 2—N.A.
September 3—N.A.
September 4—N.A.
September 5—N.A.

Scrap Prices
Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	56	51
Yellow brass	50	49½
Red brass	51	47
Comm. bronze	52½	47½
Mang. bronze	41½	40½
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	44
Light copper	36

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	40
Light copper	32
No. 1 composition	45
No. 1 comp. turnings	44
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	25
Radiators	34

Aluminum

New mixed clips	35	— 36
Old sheet	33	— 34
Old cast	33	— 34
Clean dry borings	34	— 35

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	28	— 29
Mixed L.C. clips	26	— 27
Old sheets and cast	23	— 24
Borings and turnings	19	— 20
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 47
No. 2 copper wire	36	— 37
Light copper	31	— 33
Radiators	26	— 27
No. 1 composition	36	— 37
No. 1 composition turnings	34	— 35
Cocks and faucets	27	— 28
Clean heavy yellow brass	25	— 26
Brass Pipe	27	— 28
New soft brass clippings	37	— 39

Lead

Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel

Nickel solids	105	—115
Nickel rod ends	105	—115
Nickel sheets, clips	105	—115
Nickel turnings	25	— 35

Zinc

New zinc clippings	16	— 17
Old diecast zinc	12	— 13

EFFECTIVE SEPTEMBER 8, 1986

(Effective September 8, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 76.00 to	$ 77.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	93.00 to	94.00
No. 1 factory bundles (auto)	94.00 to	95.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	87.00 to	88.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	42.00 to	43.00
Low phos. punchings plate	104.00 to	105.00
Heavy turnings	66.00 to	67.00
No. 1 RR hvy. melting	86.00 to	87.00
Rails, 2 ft. and under	96.00 to	97.00
Scrap rails, random lgth	83.00 to	84.00
RR specialties	96.00 to	97.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	495.00 to	505.00
18-8 turnings	395.00 to	405.00

Chicago

No. 1 hvy. melting	$ 73.00 to	$ 74.00
No. 2 hvy. melting	68.00 to	69.00
No. 1 dealer bundles	89.00 to	90.00
No. 1 factory bundles (auto)	91.00 to	92.00
No. 2 dealer bundles	57.00 to	58.00
No. 1 busheling	83.00 to	84.00
Shredder scrap	81.00 to	82.00
Machine shop turnings	26.00 to	27.00
Mixed borings and turnings	20.00 to	21.00
Shoveling turnings	27.00 to	28.00
Cast iron borings	40.00 to	41.00
Low phos. forge crop	94.00 to	95.00
Low phos. punchings plate 1/4 in. and heavier	111.00 to	112.00
Low phos. 2 ft. and under	106.00 to	107.00
No. 1 RR hvy. melting	76.00 to	77.00
Scrap rails random lgth	79.00 to	80.00
Reroller rails	100.00 to	101.00
Rails, 2 ft. and under	96.00 to	97.00
RR couplers and knuckles	81.00 to	82.00
RR car axles	106.00 to	107.00
No. 1 machinery cast	103.00 to	104.00
Cupola cast	90.00 to	91.00
Stove plate	99.00 to	100.00
Steel car wheels	87.00 to	88.00
Stainless		
18-8 bundles and solids	465.00 to	475.00
18-8 turnings	370.00 to	380.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 72.00 to	$ 75.00
No. 2 hvy. melting	64.00 to	67.00
No. 1 dealer bundles	84.00 to	87.00
No. 2 dealer bundles	51.00 to	54.00
No. 1 busheling	84.00 to	87.00
Shredder scrap	84.00 to	87.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	38.00 to	41.00
Low phos. 5 ft. and under	79.00 to	82.00
Low phos. 2 ft. punchings	93.00 to	96.00
Electric furnace bundles	90.00 to	93.00
RR specialties	79.00 to	82.00
Rails, 2 ft. and under	96.00 to	99.00
Cupola cast	85.00 to	88.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	35.00 to	36.00
No. 1 busheling	70.00 to	71.00
Drop forge flashings	44.00 to	45.00
Machine shop turnings	26.00 to	27.00
Mixed borings and turnings	7.00 to	8.00
Shoveling turnings	26.00 to	27.00
Cast iron borings	22.00 to	23.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	47.00 to	48.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	450.00 to	460.00
18-8 turnings	330.00 to	340.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 57.00 to	$ 58.00
No. 2 hvy. melting	55.00 to	56.00
No. 1 dealer bundles	75.00 to	76.00
No. 2 dealer bundles	33.00 to	34.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Low phos. plate	74.00 to	75.00
Electric furnace bundles	63.00 to	64.00
Galvanized bundles	60.00 to	61.00

Cleveland

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	80.00 to	81.00
No. 1 factory bundles	78.00 to	79.00
No. 2 bundles	31.00 to	32.00
No. 1 busheling	70.00 to	71.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	20.00 to	21.00
Cut structural & plates, 5 ft. and under	71.00 to	72.00
Cut structural & plates, 2 ft. and under	92.00 to	93.00
Low phos. punchings plate	92.00 to	93.00
Foundry steel, 2 ft. & under	54.00 to	55.00
No. 1 RR hvy. melting	60.00 to	61.00
Rails, 2 ft. and under	89.00 to	90.00
Rails, 18 in. and under	91.00 to	92.00
No. 1 machinery cast	80.00 to	81.00
Mixed cast	47.00 to	48.00
Stainless		
18-8 bundles	450.00 to	460.00
18-8 turnings	335.00 to	345.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	43.00 to	44.00
No. 1 busheling	71.00 to	72.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	13.00 to	14.00
Mixed boring and turnings	13.00 to	14.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	27.00 to	28.00
Low phos. plate	78.00 to	79.00
Structural and plate, 2 ft. and under	79.00 to	80.00
Rails, 2 ft. and under	79.00 to	80.00
Scrap rails, random lgth	61.00 to	62.00
No. 1 machinery cast	74.00 to	75.00
No. 1 cupola cast	71.00 to	72.00

St. Louis

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	58.00 to	59.00
No. 1 busheling	80.00 to	81.00
No. 1 dealer bundles	82.00 to	83.00
No. 2 bundles	56.00 to	57.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	27.00 to	28.00
No. 1 RR hvy. melting	79.00 to	80.00
Rails, random length	72.00 to	73.00
Rails, 5 ft. and under	86.00 to	87.00
RR specialties	79.00 to	80.00
Cupola cast	66.00 to	67.00
Heavy breakable cast	40.00 to	41.00
Stove plate	85.00 to	86.00
Steel car wheels	85.00 to	86.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	49.00 to	50.00

Birmingham

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	70.00 to	71.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	36.00 to	37.00
Electric furnace bundles	67.00 to	68.00
Elec. furnace, 3 ft. & under	70.00 to	71.00
Structural and plate, 2 ft.	89.00 to	90.00
Structural and plate, 4 ft.	83.00 to	84.00
No. 1 RR hvy. melting	83.00 to	84.00
Scrap rails, random lgth	73.00 to	74.00
Rails, 2 ft. and under	90.00 to	91.00
Angles and splice bars	83.00 to	84.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	72.00 to	73.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	77.00 to	78.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	75.00 to	76.00
No. 1 cupola cast	64.00 to	65.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	68.00 to	69.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	31.00 to	32.00
No. 2 dealer bundles	20.00 to	22.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	420.00 to	440.00
18-8 turnings	320.00 to	340.00
430 prepared solids	90.00 to	100.00
410 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 51.00
No. 2 hvy. melting	39.00 to	41.00
No. 1 dealer bundles	50.00 to	52.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	56.00 to	58.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	72.00 to	77.00
Mixed cupola cast	44.00 to	46.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	20.00 to	21.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 34.00 to	$ 36.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	67.00 to	69.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 74.00
No. 2 hvy. melting, cut 2 ft. and under	66.00
No. 1 dealer bundles	82.00
No. 2 bundles	58.00
Mixed steel scrap	53.00
Bush. new fact. prep'd	77.00
Bush. new fact. unprp'd	60.00
Machine shop turnings	30.00
Short steel turnings	30.00
Mixed borings and turnings	19.00
Cast scrap	97.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 62.00 to	$ 63.00
No. 2 hvy. melting	52.00 to	53.00
No. 2 bundles	33.00 to	34.00
Machine shop turnings	13.00 to	14.00
Crushed turnings	24.00 to	25.00
Shredder scrap	70.00 to	71.00
Cut structural plate, 2 ft. and under	88.00 to	89.00
Cut structural plate, 5 ft. and under	70.00 to	71.00
Unstripped motor blocks	54.00 to	55.00
Cupola cast	81.00 to	82.00

A RALLY IN ORDERS? NO, NOT YET

Orders received by durable goods producers rose 4.1 pct in July. This brought the dollar volume of orders for the month to $106.9 billion.

That sounds like real good news, but it probably isn't.

In the first place, about 80 pct of the month-to-month gain was due to a big jump in orders for defense-related capital goods. These orders rose to $10.3 billion, up from June's $7.3 billion. But these big-tag defense orders tend to yo-yo wildly. The pattern over the past two months was typical; orders were up 40 pct in July after falling 13 pct in June.

In July, orders for nondefense capital goods rose about 4 pct to $27.4 billion. And the seven month picture for these orders this year shows a decline of 0.2 pct from the same period in 1985.

One economist has said the economy "has done a kind of stutter-step over the past three to four months." And that stutter-step, apparently, has carried right down to the flow of orders in industry. For example, orders received in July by producers of transportation equipment were up 22 pct. In June, these orders were down 16 pct.

So, between roller-coaster defense orders, and the stutter-step economy, it has been hard to get a bearing on the real strength of orders.

It is now more important than ever to look beyond month-to-month data to get such a bearing. Case in point: While the July 4.1 pct rise in overall durable goods new orders at first appeared to be heartening news, it has to be kept in mind that these orders were still some $1.5 billion less than the order volume back in the opening month of the year.

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted Source: U.S. Dept of Commerce		Latest Month or Qtr	Previous Month or Qtr	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	3rd Q*	$388.9	$387.4	$388.9
Manufacturing, Total	3rd Q*	148.5	148.0	154.0
Manufacturing, Durable Goods	3rd Q*	71.4	72.2	72.9
Mining Industry	3rd Q*	12.5	12.6	15.9
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	July	106.9	102.7	104.4
Shipments	July	105.5	104.6	102.5
Inventories	July	186.7	187.1	192.2
Unfilled Orders	July	355.3	353.9	351.1
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	July	27.4	26.4	26.7
Capital Goods Producers Defense Industries	July	10.5	7.3	9.6
Primary Metals, Total	July	9.1	9.3	10.6
Steel (SIC 331)	July	3.7	3.8	4.5
Iron & Steel Castings (SIC 332)	July	1.0	1.1	1.2
Nonferrous Metals	July	4.3	4.4	4.9
Nonelectrical Mach.-Equip. Industries, Total	July	17.2	16.9	17.5
Engines & Turbines	July	1.0	1.2	1.3
Farm Mach.& Equipment (Shipments)	July	0.7	0.8	0.8
Construction, Mining & Mat. Hdlg. Equip	July	2.6	2.4	3.0
General Industrial Machinery	July	1.5	1.6	1.3
Metalworking Machinery	July	0.8	0.7	1.0
Machine Tools, Total ($Mill.)**	July	189.2	201.2	199.9
Machine Tools, Metalcutting**	July	149.8	156.8	149.9
Machine Tools, Metalforming**	July	39.4	44.4	50.0
Electrical Mach. & Equip. Industries, Total	July	17.0	17.9	15.2
Elec. Transmission & Ind. Equip.	July	2.2	2.0	2.1
Household Appliances	July	1.6	1.5	1.4
Communication Equipment	July	5.9	7.0	5.0
Transportation Equipment,Total	July	26.7	23.5	26.7
Motor Vehicles & Parts (Shipments)	July	16.9	16.5	15.8
Aircraft, Missiles & Parts	July	9.5	5.3	9.3
Shipbuilding & Military Tanks	July	1.5	1.0	1.1
Fabricated Metal Products, Total	July	14.3	14.0	14.2
Instruments, Total	July	4.7	4.5	4.9

*Est. – Commerce Dept. **Source: NMTBA

10/16/86 C2150-8

IRON AGE

OCTOBER 17, 1986

MANUFACTURING MANAGEMENT

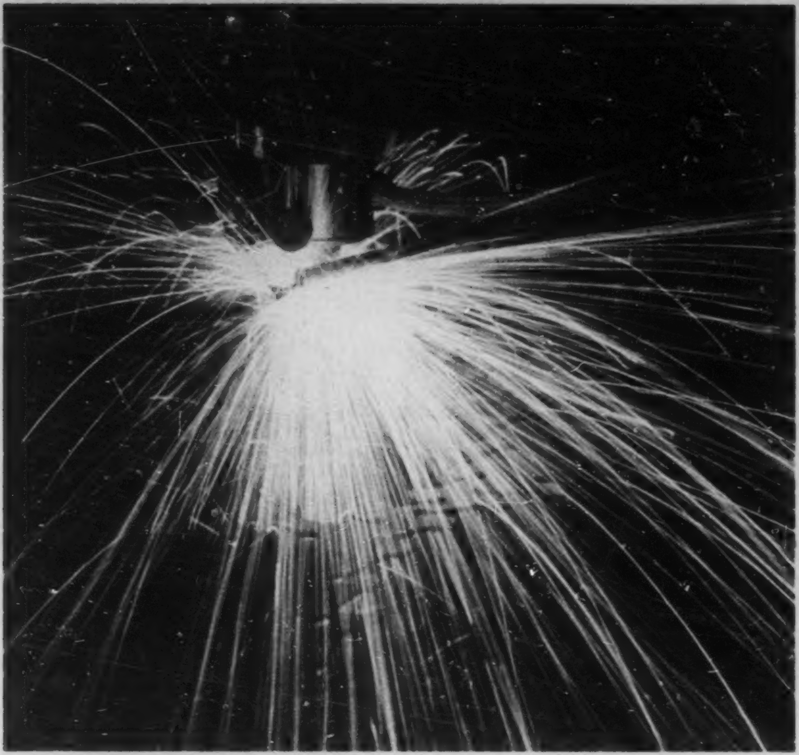
Lasers and Manufacturing: Still a Period of Adjustment

Lessons Learned at IMTS '86

CK0141------A---00 APR87
ATTN: S R I DIR
CONGRESSIONAL INFO SERV.
4520 E. W. HWY., STE 800
BETHESDA MD 20814

OCTOBER 17, 1986 VOL. 229, NO. 20

IRON AGE
MANUFACTURING MANAGEMENT



Cover photo courtesy of Coherent General, Inc.

Editorial 5
Do they know something we don't know?

Newswatch 13
The trade deficit will hit massive level, a former Reagan aide says.

You and Your Job 25
Most workers have difficulty measuring their career progress.

Lasers 27
These high-tech devices have seen little light on the factory floor.

IMTS-86 33
Some products discovered at IMTS offered some unusual promise.

Rover 41
Technology and employee involvement drive the British automaker.

Copper 44
Copper producers remain optimistic about demand and prices.

Technically Speaking 51
For the first time, scientists can see both atoms and their bonds.

Materials Report 63
Steel producers are taking advantage of tighter supply to raise prices.

Price Trends 68
Competition is tougher in a low price economy.

Next Issue: GM's Saturn.

Departments

EDITORIAL STAFF 8
LETTERS 8
INDUSTRIAL BRIEFS 22
PRODUCT & EQUIPMENT REVIEW 52
FREE LITERATURE 57
FYI 58
MANAGEMENT SERVICE CARD 59
AD-INDEX 61
BUSINESS STAFF 61
P&P DATA 9/22 64
FERROUS SCRAP 9/22 65
CLEARING HOUSE 66

IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition – $52 one year, $85 Canada/Foreign (24 issues). Metalsproducer edition – $30 one year, $56 Canada/Foreign (12 issues). Single copies, $3.00. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 2040, Radnor, PA, 19089.

Chilton
ONE OF THE ABC PUBLISHING COMPANIES

Lasers and Manufacturing: Still a Period of Adjustment

Although industrial lasers have been around for a quarter of a century, they have yet to be welcomed with open arms on the factory floor.

BY ROBERT E. HARVEY

This Laser Cutting Center for Spectrum Laser Corp., Wheeling, Ill., employs a Photon Sources, Inc., laser to provide precise cutting accuracies.

The promise of industrial lasers, so long so bright, remains tantalizingly out of reach.

That is not to say that lasers are not being used on the shop floor. They are—in growing numbers. Aerospace firms, automotive companies, and electronics manufacturers in particular are finding increasing uses for the marking, heat treating, cladding, cutting, drilling, and welding capabilities of lasers. Reportedly, more than 6,000 material-working lasers are now in operation.

However, until now, sales have been sporadic and below expectations. The laser industry still hasn't hit its stride. The period of adjustment between lasers and manufacturing drags on and on.

Disappointing sales have not been due to a lack of potential applications. "In just about any manufacturing plant I can find at least one application that can best be handled by a laser," observed William H. Shiner, vice president sales and marketing, Coherent General, Sturbridge, Mass.

Nor is the high initial cost of laser systems the principal deterrent. If prices were exorbitant, laser sales to small job shops would not be on the rise.

Since the laser is not a traditional manufacturing tool, the biggest obstacle to its acceptance has been ignorance of its possibilities. Erase this ignorance and laser sales will soar—or so laser suppliers assumed.

Well, ignorance is fading. Skepticism as to the usefulness of industrial lasers is dissipating. The laser has become recognized as a effective manufacturing tool. Yet this new awareness has not opened factory doors as wide as expected.

If lasers are such valuable tools, why aren't plants snapping them up? The reasons are many, but the most prominent one, the one laser suppliers thought they had licked, remains ignorance.

"If process engineers now recognize the availability of laser technology and now know something about it, there are still very few with specific knowledge of what a laser can do," noted Michael Laird, vice president, marketing, International Laser Machines Corp. (ILM), Indianapolis, Ind., a recent acquisition of Cincinnati Milacron, Inc., Cincinnati.

Engineers Uncertain

Although lasers are versatile, each has a particular profile. Each application has its own characteristics as well. Each demands a particular laser wave length, energy level, beam profile, and beam modulation signature.

Although he or she knows about lasers generally, too often the process engineer does not know if a particular laser will cut $^{1}/_{4}$-in. type-304 stainless steel, produce the edge that's needed, or the 300 parts by four o'clock.

"It all gets back to education," continued Mr. Laird: "on-the-job training, in-house training. It also gets back to good competitive intelligence, learning how related industries are using lasers.

"Automotive companies are using a lot of lasers. If other fabricating industries were really on the ball, doing competitive intelligence, they would be looking at how a car gets cut, trimmed, and welded by lasers. If lasers can do those things to a car, why not a toaster or tractor."

To produce better informed engineers and machinists, trade schools and universities should sharpen their focus on lasers. Also needed are standard, codified tests or benchmarks to make it easier to compare lasers with lasers and with other equipment.

Currently, too many laser companies service the marketplace. Some are doing well, others are breaking even, but many are struggling.

If specific knowledge of and confidence in lasers are slow in coming, they are coming.

"The automotive industry is accustomed to buying production equipment from the conventional automation houses," said Coherent General's Mr. Shiner. "What has happened over the past few years is that these houses have taken an interest in lasers. They are putting the stamp of credibility on laser technology. A lot of companies that would never buy from a laser company are comfortable with a laser from an automation supplier."

According to Mr. Shiner, laser sales have grown slowly because not only has the end user had to be educated but the production equipment suppliers as well.

For laser usage to take off, a critical mass usually must be reached. After a certain number of companies in an industry buy lasers, purchases throughout the industry escalate rapidly due to competitive pressure. So far, only a few industries have reached that stage. But laser suppliers are confident that this point will be attained in a number of niche markets soon.

Also slowing laser sales are old-fashioned cost accounting methods. Using these methods makes justification difficult.

It is instructive to see why most laser purchases are made. Frequently, a laser is purchased to perform one task, usually a high volume operation. Typically, a laser is justified by the amount of throughput it can generate. In contrast, laser job shops are springing up throughout the U.S. They are buying lasers for flexibility, not speed.

It is curious that on one hand lasers are being purchased for dedicated high-output jobs, while on the other they are being bought to do a wide variety of small batch production operations.

Production in most companies, however, falls somewhere between the low-volume job shop and the dedicated factory. Because a laser fits well into both the job-shop and the high-production environment, it would seem that it would be ideal for average shop which requires both flexibility and dedication. But such is not the case.

Antiquated Accounting

These mid-volume firms have not seen the light, so to speak, because of accounting practices. It is difficult with present accounting methods to figure the cost of inflexibility. With a dedicated line, management can count pieces per hour and the number of people on the line to easily determine operating costs. But figuring the cost of job-shop operations, particularly in a large plant, is extremely difficult.

"Until companies get a better understanding of the enormous cost that they bear by having parts sitting around weeks before they are processed, they will find it very difficult to justify the economics of a laser," said Mr. Laird. "In other words, figuring out how much inflexibility really costs is tough to get a handle on.

"By way of contrast, the job shop deals with that problem every day. And though the shop might not be able to justify operations down to the last decimal, it recognizes the need for the flexibility to move quickly from one job to the next."

Another obstacle to increased sales is the high cost of an industrial laser. A laser machining center, for example, can cost over $200,000. Typically, a laser arrives as part of a custom system. So not only must a laser be purchased but all the attendant controls, software, hardware, and engineering as well.

Since laser systems don't come cheap, laser suppliers and manufacturers have worked hard at trimming costs.

"Without a doubt, lasers represent a price-sensitive market. On the other hand, it is still a high technology, high engineering content product. There is still a need to pay for the high engineering overhead and the inherent risk associated with the business," explained Mr. Laird. "Over time that situation is going to change in favor of a consumer. I think significant price reductions will occur gradually over the next five to seven years."

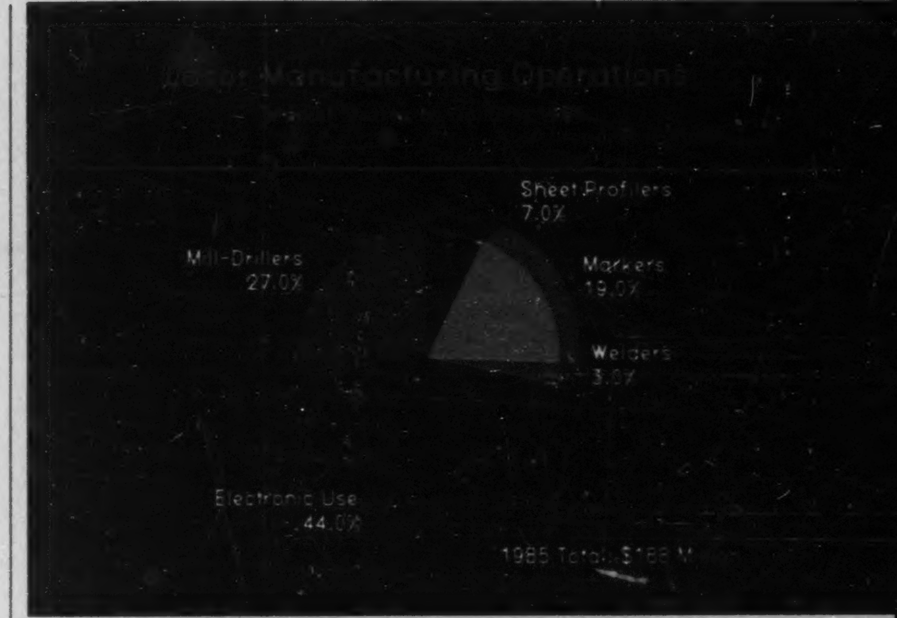
Most laser makers agree that low volumes, more than any other factor, are responsible for high costs. However, another reason is the high cost of R&D, particularly R&D for laser redesign to meet changing factory needs.

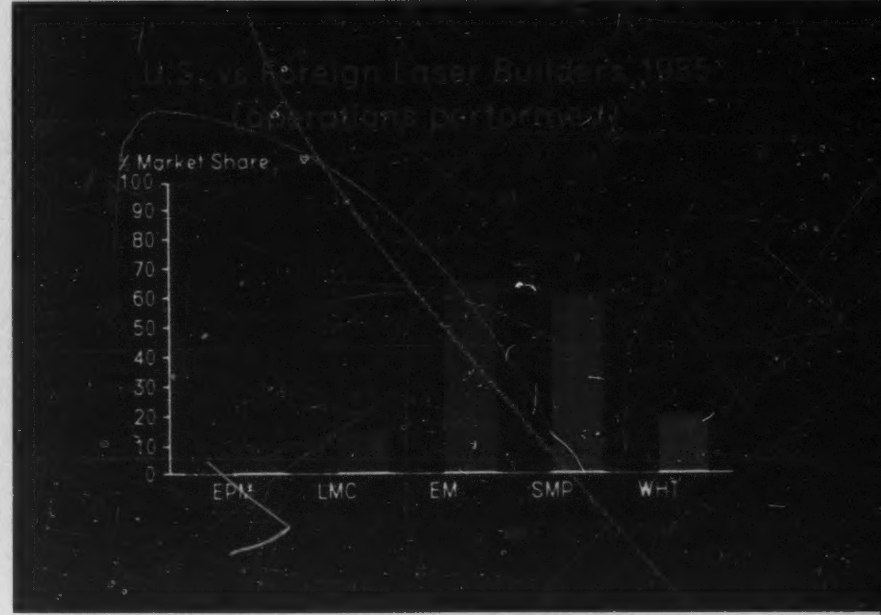
"The first lasers that were introduced to industry," explained Mr. Shiner, "were easy to justify because they were doing applications that, number one, couldn't be done any other way, or, number two, involved expensive parts which could be turned out rapidly with lasers.

"As lasers get into more mundane applications, they must be redesigned for new demands."

The laser industry initially serviced aerospace needs, machining expensive parts and exotic materials. Now it is moving into automotive and related industries. "Now that we are competing—and doing very well—against conventional techniques, reliability and servicability has got to improve," said Mr. Shiner.

Currently, too many laser companies service the marketplace. Some are doing well, others are breaking even, but many are struggling. Expected industry





EPM: electronic production machines; LMC: laser machining centers; EM: engraver/markers; SMP: sheet metal profilers; WHT: welding/heat treating.

failures and consolidations should bring about higher volumes for the survivors. And higher volumes should mean lower costs. The continuing drop in computing power should help keep costs down for laser systems as well.

The industry is already undergoing something of a shake up. As mentioned, ILM was recently purchased by Cincinnati Milacron. ILM is to be a wholly-owned subsidiary of Milacron. Milacron had been combining lasers with its industrial robots and integrating them into flexible manufacturing systems.

The company decided to get more heavily involved with lasers because: "Lasers to process materials are becoming a very important manufacturing technology in virtually all the industries that Milacron serves," said James Geier, chairman. "They have many applications in metalworking and in processing both plastics and composite materials."

Industry Shakeup

Elsewhere, C-E Industrial Lasers, Inc. (CEIL), a subsidiary of Combustion Engineering, Inc., Stamford, Conn., purchased Koppers Laser Systems Div., Westminster, Md., in a move, say officials, to further enhance C-E's overall systems approach to the industrial laser market.

Koppers Laser Systems makes a line of CO_2 lasers and laser processing centers. The centers consist of: machine tool components for work piece manipulation, beam delivery systems, and integrated CNC controls which interface with almost any laser. "These systems are important because of the critical interface between the laser and the workstation. It is often the weak link in the laser-based system," said CEIL President Charles McGough.

Virtually every laser system sold is a customized product. Some laser companies, though, see a different route to profitability. They plan to get out of the customized systems business (with its high engineering overhead) and target laser sales at OEMs and systems houses that will incorporate lasers into their products. By leaving behind the custom engineering work, some believe, they can concentrate on what they do best: laser design and development. However, other laser firms see problems with this approach.

Money can be made selling systems, insists Donald Hoffman, marketing manager, Raytheon Co. Laser Products, Burlington, Mass. "The trick is that you develop a series of standard modules. The more systems you build, the more modules you have, and we build a lot of systems. Whenever we design a system, we ask how much standard equipment can be put in. Maybe the laser is going to be standard; the CNC controls are probably going to be standard; the tables are probably going to be standard; and maybe some degree of beam motion is going to be standard. Perhaps when completed, only 10 or 20 pct of this custom

An auto supplier uses the Wiedemann Centrum Laser, a high-precision, computer-controlled fabricating system, to cut engine gaskets from sheet metal.

system needs to be customized."

Despite the sputtering demand for lasers in general, demand in certain areas is growing. Laser marking, for example, is generating a great deal of interest.

"The military has mandated that virtually everything will be serialized," explained Mr. Hoffman. "Take the new Beretta pistols that the Army plans to buy. Each pistol will be laser marked and every part in every pistol will be laser marked. In the automotive industry as well, the new anti-theft programs are requiring that certain critical parts will be laser marked. The applications go on and on."

Marking a part can be done with a number of tools, many a lot cheaper than a laser. However, laser marking, which has been around for a decade, has some advantages over techniques like ink printing, hot stamping, and others. Laser marks cannot be smeared, washed or rubbed off, or burned off during heat treating. Lasers also offer speed, ease of use, and flexibility.

Permanent History

Increasingly, the military, aircraft manufacturers, and auto makers are requiring a permanent history of critical manufactured parts. If a plane crash results from a part failure, for example, officials want to be able to track the history of that part back to its origins: the place where it was made, when, and by whom. Indelible bar codes, alphanumerics or other symbols etched on the part by a laser during manufacture can provide that information.

Raytheon's marking laser, EnduraMark, can etch a multitude of bar codes as well as script and gothic writing styles. As options, it has a mouse and can be tied into a CAD/CAM system. It has a writing speed of almost 100 in./sec and can operate over a 36 sq in. marking area. Reportedly, it is easy to use and reprogram.

Besides using marking to trace the history of a part after that part has left the factory, manufacturers are using marking, particularly bar coding, as an integral part of factory automation efforts. Increasingly, companies want to track the status of parts and operations automatically. Bar coding, OCR and vision systems permit this tracking. Marking lasers are central to many automated tracking operations.

"Customers are interested in using bar codes to track products through their manufacturing process," said Mr. Laird. "The problem is that bar codes are not a very consumer-friendly method of identification. They can't be read with the human eye. One customer of ours is considering installing a system at a final step in his manufacturing process that will read bar code with a laser scanner and then dump that information into our laser marker. Then the marker will write in English a description of the part and other required information."

Laser Job Shops

As mentioned earlier, laser job shops are on the increase. And even job shops specializing on laser marking are appearing. These marking specialists are having the greatest success servicing the electronics, jewelry, and medical industries.

"Besides marking, another area that appears to be strengthening is laser drillers for jet engines," noted Don Hoffman of Raytheon.

But much of the growth of laser use remains in the future.

Laser welding, for example, has a great deal of potential. "But the welding function is growing much more slowly than the rest of the industry," said Mr. Laird. "The laser produces a very superior weld. But it requires superior fixturing to make that happen. The laser beam is probably the best at creating a weld bead with high integrity. It is one of the few technologies for welding dissimilar metals together. Its disadvantage is that the spot size, by necessity, has to be quite small; that means fixturing becomes very critical."

Right now it is costly to get a part precisely fixtured in order to have a successful weld time after time. But this problem could soon be overcome.

"At present, the automotive industry tends to go with oversize lasers because part tolerances cannot be held tightly enough," said Mr. Shiner. "But two trends are converging: the automotive industry is driving toward more accurate parts control, while laser companies are working on developments like seam tracking and automatic focus to increase accuracies. These trends should come together in about three years."

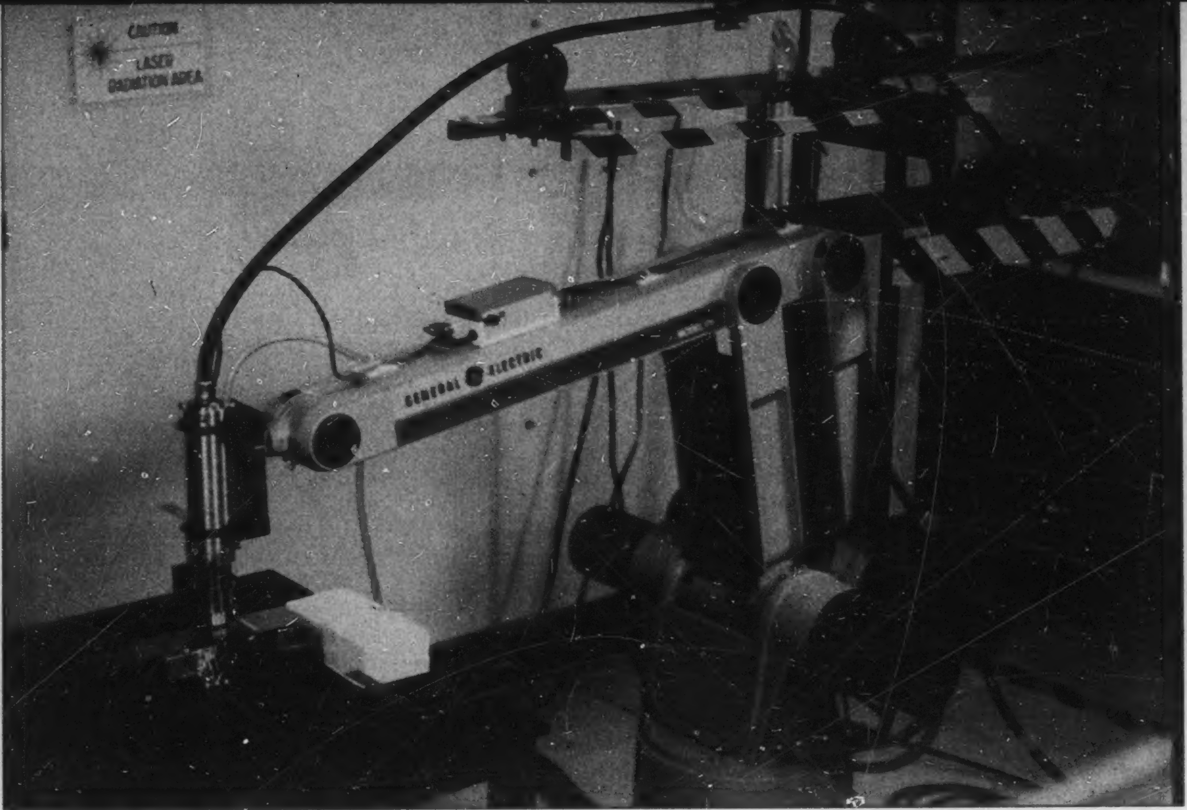
Trends suggest the installation of 25,000 material working lasers by the year 2000, reports Fred Seaman, manager, Laser Center, IIT Research Institute, Chicago. Some of the major growth areas that will accelerate in the next few years will be the increased use of lasers for metallurgical operation such as heat treating, cladding and alloying, and the further inclusion of lasers in flexible manufacturing systems, says Mr. Seaman.

Heat Treating Growing

Although right now a small percentage of laser applications involve heat treating, the potential is there for strong growth. Laser heat treatment acts much like induction hardening except: "Rapid cooling after laser heating can often be accomplished without resorting to distortion-producing quench baths or sprays," said Mr. Seaman at the SME Lasers in Manufacturing: SPOT '86 Conference last May in Philadelphia. "In addition, hardening can be accomplished deep inside cavities in the work piece or while the part is still held in a machine tool.

"And finally, hardened zones can be formed in precise, complex shapes located exactly where they are needed, so that the effect of heating on part precision can be held to a minimum."

These qualities, noted Mr. Sea-



Mounted on a GE robot is a laser from Coherent General Corp., Sturbridge, Mass.

man, make lasers an attractive competitor to any traditional heat treating operation aimed at achieving a hard surface on steel or cast iron, particularly if the hardened surface is required only at selected places.

Laser heat treating is growing at a slow rate right now, said Mr. Laird. But it will begin to change when designers begin rethinking the way they design products.

Laser heat treating will always be one of the most expensive ways to heat treat because of the inherent inefficiencies of converting electricity to laser light. For laser heat treating to be effective, designers must think about the minimal amount of heat treating necessary for a part—particularly a part with complex surfaces—to function properly.

Another area of potential growth involves the integration of lasers and conventional metal and other material working processes into one system.

"Since the mid-1970s, lasers have been integrated with NC turret punch presses," noted Mr. Seaman, "but other uses are opening up for laser integration. Studies indicate the benefits of laser beams on the removal of metal in single-point turning operations."

By heating the metal during the machining operation, removal rates were increased in some cases by as much as 50 pct, while tool wear was decreased and surface finish improved. Hard to machine materials such as titanium alloys have been more easily machined with the assistance of a laser. If able to assist in machining hardened steel work pieces, laser assisted machining could replace some grinding operations.

Lasers are not only assisting material working machines but robots as well. Sales of laser robots have not been spectacular. The high cost of the robot plus the high cost of the laser makes the combination difficult to justify. Another concern is the inaccuracies and lack of speed of the robot.

Besides assisting machine tools in punching and turning operations, lasers in years to come could add flexibility to a variety of manufacturing cells.

ILM has developed what it believes is the first flexible cell composed entirely of lasers. The cell, made up of seven lasers and an automated inspection station, is going to Pratt & Whitney to primarily drill holes in various types of turbine blades. The lasers will be linked together with robot guided vehicles and robots.

Some other recent advances in laser products will make justification increasingly easier.

The Wiedemann Div., Warner & Swasey, a Cross & Trecker Co., King of Prussia, Pa., for example, gives users of its Centrum laser system (using a Spectra Physics CO_2 laser) the option of using a PC-based CAD system to streamline contouring and cutting. A further option lets an electronic tablet and pen convert drawings, blueprints, and existing parts directly into machine programs.

ILM has introduced a precision laser driller that has the ability to measure the diameter of a hole in real time during the drilling operation and adjust that drilling action accordingly.

New developments by laser companies and new awareness by process engineers is drawing manufacturing and the laser closer. It will be several years, however, before the period of adjustment yields the happy marriage envisioned by many. ☐

COPPER FORESEES LESS RED INK

Despite their troubles, copper producers remain optimistic about a turn-up in demand and a chance for much-needed higher prices.

BY ROBERT REGAN

The U.S. copper producers had a lot to look forward to coming into 1986. Interest rates were coming down, the dollar was dropping and so were oil prices.

At the halfway mark they were still waiting for it all to fall in place. Copper prices were on the defensive, import pressures were persisting and there was the seasonal slowdown still to get through.

And yet the producers, perhaps hardened by a series of false starts on the hedge markets, remain optimistic about a turn-up in demand and a chance for much-needed higher prices.

One comforting thought that has crossed the minds of more than a few industry executives is that there wasn't any significant inventory buildup by consumers in front of this year's round of wage negotiations. That means no wait for an inventory workdown.

As G. Robert Durham, president of Phelps Dodge Corp., explained in an interview, "consumers were practically living off the tailgates of our trucks in the first half. They had no inventory to speak of and they can't have much now."

This year was something of a pattern-breaker for the copper industry. Instead of the hedge buying that preceded several earlier triennial wage bargaining rounds, producer shipments were running about 7 pct off the 1985 pace (with some of the difference taken up by imports) and there were no lengthy work stoppages.

Asked what happened to the gains anticipated from the lower dollar, lower oil prices and lower interest rates, Phelps Dodge Chairman George Munroe said with a wry chuckle, "I don't really know. We expected to see something on the consumption side, but we've learned to wait and we still have expectations."

The Phelps Dodge executives said one handicap in the first half was a dearth of trading interest on the hedge markets. Asked if there was a bit of nostalgia for the speculators and volatility, Mr. Munroe said: "You could put it that way if you want to. They certainly have been quiet. Open interest is way down, there's no inflation to speak of, and there are other things the speculators are more interested in."

Ronald J. Vance, vice president, marketing for Newmont Mining Corp., explained that the copper producers were in large part responsible for the consumers' ability to sidestep the inventory-building chore.

"We had a strange situation this time," he said. "We, and other producers too, were saying to the customer 'we will get every pound of copper possible to produce by July 1 to you—or where you will be able to get it—by July 1.' Some of us were also saying operations would continue somehow even if there was a strike.

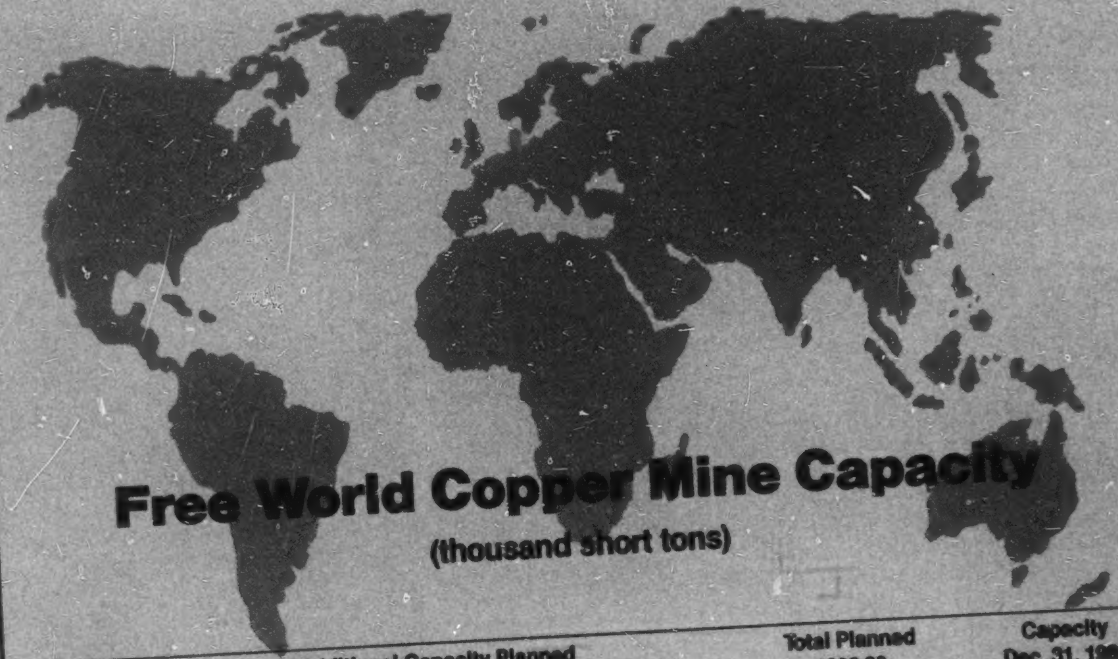
"So, very few of them, if any of them at all, put much extra copper by."

Was the idea to keep them away from imports?

"Well, that, too—but did it? It also was to keep them from going to the other guy. The consumers have gotten quite used to the idea that, when they want copper, all they have to do is pick up the phone. Somebody's always had it ready for them—producers, dealers, exporters—so they weren't that anxious this year... thank goodness."

Copper shipments by the U.S. refineries were down almost 7 pct in the first half, according to the American Bureau of Metal Statistics. ABMS also reported that refined copper imports were up nearly 52 pct in the first third of the year. Chile was the largest supplier, but Canada was close behind.

Brian O'Shaughnessy, senior vice president, marketing for Inspiration Resources Corp., said there had been all sorts of arrangements between producers and consumers in the first half, "but I don't think it led to much of



Free World Copper Mine Capacity

(thousand short tons)

Area/Country	Additional Capacity Planned 1986	1987	1988	1989	Total Planned 1986-89	Capacity Dec. 31, 1989
North America						
United States	35	40	(20)	—	55	1,857
Canada	13	14	—	—	27	1,011
Mexico	65	—	—	—	65	400
Total	113	54	(20)	—	147	3,268
South America						
Chile	25	130	100	165	420	1,920
Peru	(15)	—	—	—	(15)	480
Other	—	—	—	—	—	80
Total	10	130	100	165	405	2,480
Africa						
Zambia	50	—	—	—	50	720
Zaire	—	—	—	—	—	600
S. Africa	(30)	—	—	—	(30)	205
Other	—	—	—	—	—	155
Total	20	—	—	—	20	1,680
Asia						
Philippines	—	—	—	—	—	430
Indonesia	—	—	—	—	—	100
Iran	—	—	—	—	—	80
Japan	—	—	—	—	—	50
Other	—	—	—	—	—	180
Total	—	—	—	—	—	840
Western Europe	—	12	75	—	87	507
World Total	134	186	210	140	670	9,256

Source: American Bureau of Metal Statistics/Phelps Dodge Corp.

a physical buildup at consumer plants."

Near-Term Prospects

As for copper's near-term and mid-term prospects, he said: "Basically, I think it's going to have a lot to do with the general business recovery. If it has another year to run, well, fine and dandy and I don't think copper prices in the mid-70¢ a lb range would be out of line. If it falters, then things could get a bit tough."

Mr. O'Shaughnessy said copper's fundamentals are positive "and more copper will have been used than was produced in every quarter this year except the third quarter—and that will go for early 1987, too."

Asked if recent poor projections for capital spending don't pose a problem for copper, he said: "That's for the U.S., but there is a larger picture. I think capital spending is up elsewhere. It's true the U.S. projection is no positive factor—unless it prompts the Federal Reserve to drop the discount rate."

Newmont's Mr. Vance said of the downward revisions in U.S. capital spending plans "who could be happy about that? It's an important market for copper, but isn't it important to know who is cutting back?"

The U.S. Commerce Department's latest quarterly survey of capital spending for this year found that U.S. industry plans to spend 2.5 pct less than it spent in 1985, after allowing for inflation. That decline, according to the department's analysts, was marked by "severe weakness in the energy sector."

Mr. Munroe of Phelps Dodge said he didn't think capital spending would be down in the general manufacturing area. "I'd like to see better capital spending numbers and maybe we will. It's just taking longer than we had hoped or expected. But I think the stock market has been saying something to us. It seems to be saying business generally is holding up and maybe picking up a bit."

Mr. Durham, who suceeds Mr. Munroe as CEO upon his (Mr. Munroe's retirement next February, chimed in with the observation that "the copper market is close to balance and there isn't much downward room, pricewise."

(At the time, hedge market values and some producer prices were sagging in the wake of the Noranda Copper strike settlement and the first blushes of agreements on terms for new wage pacts by U.S. producers.)

Returning to the lowered capital spending projections, Mr. Munroe said "maybe those numbers will say to the Fed that a further interest rate cut wouldn't be harmful and, if that happens, it should draw some response in the capital spending sector."

The copper producers, unlike many of their competitors, 'have been very complacent about the end uses of copper. We produce it, but we don't promote it.'

The Phelps Dodge executives said the emerging picture of labor peace didn't necessarily mean 1986 domestic copper production would be higher than might have been anticipated earlier this year. There had been some speculation that busier work schedules might be offered to help win the deep pay cuts the companies were seeking.

Labor Settlements

The settlements announced early in July covered Asarco, Inc., Kennecott Corp. and Newmont.

The focus of the bargaining this time was how big the pay cuts would be. It all contrasted sharply with the 1971-80 period, when the bargaining centered on how big the pay boosts and cost-of-living allowances (colas) would be—and when management and labor usually arrived at terms after wide, inventory-clearing strikes that usually were preceded by bouts of inventory building.

In the 1983 round, labor singled out Phelps Dodge for special attention and the lengthy, bitter struggle ended with decertification.

Asked if he thought there would be an attempt to re-organize the company's operations, Mr. Munroe said: "Right now, they would have a tough time of it.

"I don't want to say 'never' to the unforseeable future," he added. "It's possible, of course, and it could be a different union. Who knows?"

Mr. Durham added that "right now, we have a highly motivated workforce. I would say the company is pretty comfortable. Things are not so bad for us because we've got production costs down and business isn't that bad, considering the season. If we get a pickup this fall, fine. There's nothing like improving your rate of return—but we are comfortable with things as they are and we put a lot of work into getting into that condition."

Phelps Dodge had been in the black for five straight quarters and Mr. Munroe said the second quarter would make it six. Last year's mine production topped the company's 1979 record by 20 pct.

Phelps Dodge's gradual turnaround has enabled it to pay down a sizable portion of a heavy long term debt load and pull its revolving credit debt down to zero. This, plus a substantial tax-loss carryforward, has the company actively looking for an acquisition possibility.

Mr. Durham said there is no thought of moving away from copper. The goal is a business not too distant from Phelps Dodge's own mining, engineering and basic industry background.

(Cont. on p.49)

"It's got to have a cycle different from copper's and it's got to have a good management staff because our own is pretty lean and there's no pretending we have enough inhouse talent to handle another business," he said.

Mr. Munroe added that the door hasn't been closed on a copper acquisition. He said some potential properties have been examined but that was about as far as things had gotten.

Phelps Dodge sold a 15 pct interest in its Morenci, Ariz., mine to the Sumitomo interests last February and signaled plans to sell another 15 pct later on. Talks were broken off with one potential buyer in mid-June and discussions have begun with another potential buyer.

Mr. Munroe declined to identify the company beyond stating that, as was the case earlier, it is a foreign company but not Japanese.

Late last year, Phelps Dodge doubled the capacity of its solvent-extraction, electrowinning facility at Tyrone, N.M., to 35,000 tons a year. Next step is a similar unit for the Morenci, Ariz., mine that will raise capacity of the low-cost system to 80,000 tons a year. Mr. Munroe said the process could be taken up as high as 20 pct of the company's total copper output.

Although there has been some speculation that the process could be a low-priced admission to the copper business, Mr. Munroe said this was unlikely. "There are already some small units, but it's not just something that can be set up anywhere—you've got to have the dumps," he said.

Defending Applications

Getting a better grip on wage and production costs is only part of the survival struggle for the U.S. companies. There also is the matter of defending applications hard-pressed by other materials, improving the grip on the home market and, admittedly far down the pike, expanding copper usage.

Back in 1983, the copper industry worldwide had a 200,000 metric tons a year market in automobile radiators.

'Consumers were practically living off the tailgates of our trucks in the first half. They had no inventory to speak of and they can't have much now.'

G. Robert Durham,
president of Phelps Dodge Corp.

Two years later, according to recent calculations by the International Copper Research Association (INCRA), aluminum's penetration had reached 80 pct in Western Europe, 32 pct in the U.S. and 4 pct in Japan.

As INCRA President William H. Dresher put it in a position paper presented to the copper producers: "With the intensity of the pressure of the aluminum industry today, it is extremely important that the means be found to defend copper's position in this market."

Mr. Dresher detailed a number of technical projects being carried out by INCRA and the Copper Development Association (CDA) to keep the copper/brass radiator competitive.

But, besides INCRA's design-oriented and CDA's manufacturing-oriented programs, two other steps are necessary, he said.

One is to convince the automobile companies and the radiator manufacturers that a superior copper/brass radiator can be built. It would involve direct contact with design and engineering people in the automotive and radiator fields, participation in seminars devoted to auto radiator technology, and support for manufacturers either wishing to upgrade their copper/brass radiators or to switch from aluminum.

The second step, Mr. Dresher said, would involve working with the brass mills to assist them to meet specifications for lighter weight radiators and keeping them updated on technological concepts of radiator design and manufacture.

The catch is that "both of these steps are beyond the budgetary and manpower capabilities of INCRA and the CDA today," Mr. Dresher said.

Sentiments of a roughly similar nature were expressed by Tim Evans, manager of trading for Inspiration Consolidated at an American Copper Council meeting in San Diego earlier this year.

"If the U.S. copper producers are not to be squeezed out of the market by capacity expansions abroad, they must either lower costs below the range where currency devaluation can hurt them—or do something to reverse the declining use of copper.

"While we do have INCRA and CDA fighting a rearguard holding action, much more could be done, especially by the producers on a more competitive basis."

Mr. Evans said the copper producers, unlike many of their competitors, "have been very complacent about the end uses of copper. We produce it, but we don't promote it. It is DuPont, not J.C. Penney, that spends millions promoting synthetic fibers; it is Georgia-Pacific, not A&P, that promotes paper bags; and it is Alcoa, not Coca-Cola that promotes aluminum cans. When are we going to discover advertising?"

The main difference in the automobile radiator market, he said, "was the sales job." □

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective September 22, 1986)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	144	145	134	169
Pittsburgh	168	165	168	154
Youngstown	114	106	103	97
Lake Erie	99	104	103	143
Detroit	132	132	135	144
Chicago	342	334	322	476
Midwest	131	118	141	161
Southern	135	139	138	181
Western	41	40	40	69
U.S. Production	1,306	1,283	1,284	1,594

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 58.0*
Pellets (per iron unit natural)	gross-ton 59.4**
Pellets (per iron unit natural)	gross-ton 72.5-86.9***
Mesabi, regular-unscreened	gross-ton 32.53
Mesabi, non-bessemer	gross-ton 30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8/13/85. **59.4¢—Inland Steel Mining, 1/1/85 and Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢—U.S. Steel as of 8/16/85. 86.9¢—Oglebay Norton 3/25/82, Hanna Mining and Cleveland Cliffs, 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective September 22, 1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,306	1,283	60,642	63,471
Capability Utilization Rate	53.9	52.9	65.5	65.8

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 8/31/86)	24.951	24.951	24.850	27.582
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 73.83	$ 74.50	$ 75.17	$ 72.17
No. 2 bundles	$ 51.17	$ 52.17	$ 53.83	$ 53.17

Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 76.50	$ 76.50	$ 76.50	$ 75.50
No. 1 steel, Philadelphia	71.50	73.50	73.50	68.50
No. 1 steel, Chicago	73.50	73.50	75.50	72.50
No. 1 bundles, Detroit	72.50	72.50	72.50	69.50
Low Phos., Youngstown	74.50	74.50	74.50	70.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	93.50	92.50
No. 1 mach'y cast., Chi	103.50	103.50	105.50	99.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective September 22, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	52.54	52.07	9/22/86
Copper (C)	65.00	64.00-65.00	9/22/86
Lead	23.50	22.50-23.00	9/22/86
Magnesium Ingot	153.00	148.00	12/9/85
Nickel (LME)	169.00	166.84	9/22/86
Zinc	44.00	41.00-44.00	7/30/86

ALUMINUM: Avg. for last week & previous week. COPPER (C)=cathode. LEAD: common grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Loredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$248.00
Beryllium-copper, per lb. cont. Be	$144.00
Beryllium 97% powder 200	$197.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$11.70
Gold, per troy oz	$435.50
Indium, per troy oz	$2.65
Iridium, per troy oz	$415.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$195.00-210.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO con.	$3.25
Palladium, per troy oz	$141.00
Platinum, per troy oz	$610.00
Rhodium, per troy oz	$1,235.00
Silver ingots, per troy oz	$6.00
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd red	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

September 15—N.A.
September 16—N.A.
September 17—N.A.
September 18—N.A.
September 19—N.A.

Scrap Prices

Brass Mill Scrap

(Cents per lb., over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	56	51
Yellow brass	50	49½
Red brass	51	47
Comm. bronze	52½	47½
Mang. bronze	41½	40½
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	44
Light copper	36

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	40
Light copper	32
No. 1 composition	45
No. 1 comp. turnings	44
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	25
Radiators	34

Aluminum	
New mixed clips	35 — 36
Old sheet	33 — 34
Old cast	33 — 34
Clean dry borings	34 — 35

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum	
Segregated clippings	28 — 29
Mixed L.C. clips	26 — 27
Old sheets and cast	23 — 24
Borings and turnings	19 — 20
Duraluminum clippings	24 — 25

Copper and Brass	
No. 1 copper wire	45 — 47
No. 2 copper wire	36 — 37
Light copper	31 — 33
Radiators	26 — 27
No. 1 composition	36 — 37
No. 1 composition turnings	34 — 35
Cocks and faucets	27 — 28
Clean heavy yellow brass	25 — 26
Brass pipe	27 — 28
New soft brass clippings	37 — 39

Lead	
Heavy soft lead	5 — 7
Whole batteries	1 — 3
Type metal	15 — 17
Electrotype	13 — 14

Nickel	
Nickel solids	105 —115
Nickel rod ends	105 —115
Nickel sheets, clips	105 —115
Nickel turnings	25 — 35

Zinc	
New zinc clippings	16 — 17
Old diecast zinc	12 — 13

EFFECTIVE SEPTEMBER 22, 1986

(Effective September 22, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 76.00 to	$ 77.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	93.00 to	94.00
No. 1 factory bundles (auto)	94.00 to	95.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	89.00 to	90.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	42.00 to	43.00
Low phos. punchings plate	104.00 to	105.00
Heavy turnings	66.00 to	67.00
No. 1 RR hvy. melting	86.00 to	87.00
Rails, 2 ft. and under	96.00 to	97.00
Scrap rails, random lgth	83.00 to	84.00
RR specialties	96.00 to	97.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	495.00 to	505.00
18-8 turnings	395.00 to	405.00

Chicago

No. 1 hvy. melting	$ 73.00 to	$ 74.00
No. 2 hvy. melting	68.00 to	69.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	91.00 to	92.00
No. 2 dealer bundles	57.00 to	58.00
No. 1 busheling	83.00 to	84.00
Shredder scrap	81.00 to	82.00
Machine shop turnings	26.00 to	27.00
Mixed borings and turnings	20.00 to	21.00
Shoveling turnings	27.00 to	28.00
Cast iron borings	40.00 to	41.00
Low phos. forge crop	94.00 to	95.00
Low phos. punchings plate 1/4 in. and heavier	111.00 to	112.00
Low phos. 2 ft. and under	106.00 to	107.00
No. 1 RR hvy. melting	76.00 to	77.00
Scrap rails random lgth	79.00 to	80.00
Reroller rails	100.00 to	101.00
Rails, 2 ft. and under	96.00 to	97.00
RR couplers and knuckles	81.00 to	82.00
RR car axles	106.00 to	107.00
No. 1 machinery cast	103.00 to	104.00
Cupola cast	90.00 to	91.00
Stove plate	99.00 to	100.00
Steel car wheels	87.00 to	88.00
Stainless		
18-8 bundles and solids	465.00 to	475.00
18-8 turnings	370.00 to	380.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 70.00 to	$ 73.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	82.00 to	85.00
No. 2 dealer bundles	49.00 to	52.00
No. 1 busheling	82.00 to	85.00
Shredder scrap	84.00 to	87.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	37.00 to	40.00
Low phos. 5 ft. and under	79.00 to	82.00
Low phos. 2 ft. punchings	93.00 to	96.00
Electric furnace bundles	90.00 to	93.00
RR specialties	79.00 to	82.00
Rails, 2 ft. and under	96.00 to	99.00
Cupola cast	84.00 to	87.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	35.00 to	36.00
No. 1 busheling	70.00 to	71.00
Drop forge flashings	44.00 to	45.00
Machine shop turnings	26.00 to	27.00
Mixed borings and turnings	7.00 to	8.00
Shoveling turnings	26.00 to	27.00
Cast iron borings	22.00 to	23.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	47.00 to	48.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	450.00 to	460.00
18-8 turnings	330.00 to	340.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 57.00 to	$ 58.00
No. 2 hvy. melting	55.00 to	56.00
No. 1 dealer bundles	75.00 to	76.00
No. 2 dealer bundles	33.00 to	34.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Low phos. plate	74.00 to	75.00
Electric furnace bundles	63.00 to	64.00
Galvanized bundles	60.00 to	61.00

Cleveland

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	80.00 to	81.00
No. 1 factory bundles	78.00 to	79.00
No. 2 bundles	31.00 to	32.00
No. 1 busheling	70.00 to	71.00
Machine shop turnings	20.00 to	21.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	20.00 to	21.00
Cut structural & plates, 5 ft. and under	71.00 to	72.00
Cut structural & plates, 2 ft. and under	92.00 to	93.00
Low phos. punchings plate	92.00 to	93.00
Foundry steel, 2 ft. & under	54.00 to	55.00
No. 1 RR hvy. melting	60.00 to	61.00
Rails, 2 ft. and under	89.00 to	90.00
Rails, 18 in. and under	91.00 to	92.00
No. 1 machinery cast	80.00 to	81.00
Mixed cast	47.00 to	48.00
Stainless		
18-8 bundles	450.00 to	460.00
18-8 turnings	335.00 to	345.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	43.00 to	44.00
No. 1 busheling	71.00 to	72.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	13.00 to	14.00
Mixed borings and turnings	13.00 to	14.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	27.00 to	28.00
Low phos. plate	78.00 to	79.00
Structural and plate, 2 ft. and under	79.00 to	80.00
Rails, 2 ft. and under	79.00 to	80.00
Scrap rails, random lgth	61.00 to	62.00
No. 1 machinery cast	74.00 to	75.00
No. 1 cupola cast	71.00 to	72.00

St. Louis

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	58.00 to	59.00
No. 1 busheling	80.00 to	81.00
No. 1 dealer bundles	82.00 to	83.00
No. 2 bundles	56.00 to	57.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	27.00 to	28.00
No. 1 RR hvy. melting	79.00 to	80.00
Rails, random length	72.00 to	73.00
Rails, 5 ft. and under	86.00 to	87.00
RR specialties	79.00 to	80.00
Cupola cast	66.00 to	67.00
Heavy breakable cast	40.00 to	41.00
Stove plate	85.00 to	86.00
Steel car wheels	85.00 to	86.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	49.00 to	50.00

Birmingham

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	70.00 to	71.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	70.00 to	71.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	36.00 to	37.00
Electric furnace bundles	67.00 to	68.00
Elec. furnace, 3 ft. & under	70.00 to	71.00
Structural and plate, 2 ft.	89.00 to	90.00
Structural and plate, 4 ft.	83.00 to	84.00
No. 1 RR hvy. melting	83.00 to	84.00
Scrap rails, random lgth	73.00 to	74.00
Rails, 2 ft. and under	90.00 to	91.00
Angles and splice bars	83.00 to	84.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	72.00 to	73.00

Cincinnati

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	77.00 to	78.00
Rails, random length	59.00 to	60.00
Rails, 2 ft. and under	75.00 to	76.00
No. 1 cupola cast	64.00 to	65.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	68.00 to	69.00

New York

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	31.00 to	32.00
No. 2 dealer bundles	20.00 to	22.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	420.00 to	440.00
18-8 turnings	320.00 to	340.00
430 prepared solids	90.00 to	100.00
430 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 49.00 to	$ 51.00
No. 2 hvy. melting	39.00 to	41.00
No. 1 dealer bundles	50.00 to	52.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	56.00 to	58.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	72.00 to	77.00
Mixed cupola cast	44.00 to	46.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	20.00 to	21.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 34.00 to	$ 36.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	67.00 to	69.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	$ 60.00 to	$ 62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 74.00
No. 2 hvy. melting, cut 2 ft. and under	66.00
No. 1 dealer bundles	82.00
No. 2 bundles	58.00
Mixed steel scrap	53.00
Bush. new fact. prep'd	77.00
Bush. new fact. unprep'd	60.00
Machine shop turnings	30.00
Short steel turnings	30.00
Mixed borings and turning	19.00
Cast scrap	97.00

Houston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 62.00 to	$ 63.00
No. 2 hvy. melting	52.00 to	53.00
No. 2 bundles	33.00 to	34.00
Machine shop turnings	13.00 to	14.00
Crushed turnings	24.00 to	25.00
Shredder scrap	70.00 to	71.00
Cut structural plate, 2 ft. and under	88.00 to	89.00
Cut structural plate, 5 ft. and under	70.00 to	71.00
Unstripped motor blocks	54.00 to	55.00
Cupola cast	81.00 to	82.00

COMPANIES PAY HIGH PRICE FOR LOW PRICES

August was another month of soft prices for producer goods. Finished goods prices managed a 0.3 pct month-to-month rise. The hike was too weak to make up for a decrease in July, so August prices ended up below the July level.

These prices, through the 12-month period ending at the close of August, were down by 1.8 pct.

As noted on the table here, prices for key metalworking product lines in August flashed more minus and zero-change signs from July than they did pluses. Relatively strong-running prices for capital equipment edged up only 0.1 pct in August.

Price stability at low levels is a sought-for economic goal, of course. But lately, cheers about attaining this goal are becoming muted. Manufacturers are relearning the lesson that competition is tougher in a low price level economy. They can't hike their tags to keep up their earnings.

These tougher times for company profits show up in government aggregate data.

From the second quarter of 1984 to the same period in 1986, producer prices for industrial goods fell by 4.8 pct. This, during a time span when the U.S. economy grew by almost 12 pct.

Economic growth, however, largely because of price softness, did not give a lift to company earnings. Corporate profits, over the above-noted time span where the economy expanded by almost 12 pct, fell by about 3 pct.

Of course, students of economic trends trace these relationships back to what many consider to be square one—soaring imports. It's tough for U.S. producers to post price hikes when foreign goods of all kinds are rolling in with riptide fury.

Latest Month Covered: August 1986

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	404.7	+ 0.2	+ 1.7
Metal Forming Machine Tools	441.2	0	+ 1.5
Agricultural Machinery & Equip.	340.3	+ 0.2	+ 0.7
Construction Machinery & Equip.	367.1	+ 0.1	+ 1.3
Oil and Gas Field Machinery	412.2	[illegible] 1.6	– 3.0
Industrial Material Handling Equip.	296.9	0	+ 0.5
Pumps, Compressors & Allied Equip.	362.4	+ 0.1	+ 1.5
Mining Machinery & Equipment	380.7	– 0.4	+ 0.2
Mechanical Power Transmission Equip.	347.8	+ 0.1	+ 2.3
Automobiles	232.5	– 0.6	+ 1.9
Motor Trucks—Light	306.3	– 1.6	+ 4.4
Motor Trucks—Heavy	348.0	+ 0.2	+ 4.4
Railroad Equipment	368.0	+ 0.1	+ 0.9
Fabricated Metal Structural Products	317.2	+ 0.4	+ 0.7
Electric Motors	353.3	– 0.1	+ 0.5
Valves & Fittings (Dec. 1982 = 100)	106.9	0	+ 1.6
Ball & Roller Bearings	357.0	0	+ 0.8
Foundry & Forge Shop Products	361.9	– 0.4	– 0.7
Heating Equipment	269.0	+ 0.1	+ 3.1
Plumbing Fixtures & Brass Fittings	322.7	– 0.3	+ 3.0
Metal Containers	362.5	+ 0.1	+ 1.3
Internal Combustion Engines	354.0	– 0.1	+ 2.0

Data based on U.S. Labor Dept.'s Producer Price Index